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GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

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EDITORIAL NOTES.

The Coke Competition.

THERE is gratification on the part of the Adjudicating Committee regarding the notices that have been made by our technical contemporaries at home and abroad as to the Coke Competition for which prizes totalling £1000 were offered in the "JOURNAL" for Feb. 18. The notices evidence the large amount of interest which the scheme of pooling work and ideas on the subject of gas coke has evoked. There are now three months in which to prepare the essays or papers and any drawings or photographs which it is desired to submit. We hope that this initial interest will grow and bear abundant fruit on or before June 30, which is the closing day of the competition. There has been correspondence which suggests that we should make two or three matters perfectly clear. It has been emphasized by us that the competition is open to all countries and to anybody who has anything of value to submit in connection with any one or all of the sections; but in saying this, the point must be borne in mind that the first work of the gas industry is to make and supply gas. In that fact we have practically the only limitation applying to the competition. It shows that regard must be paid by competitors to the economic position in relation to the provision of a suitable gas for distribution to the consumers. If this is borne in mind, any one can compete in any section or in all three. It is not a *sine quâ non* that a competitor or a group of competitors should be engaged within the gas industry of this or any other country. The Committee want contributions of intrinsic worth from any source. Another inquiry has been for an explanation as to the term "copyright" in the conditions applying to the competition. The "copyright" will apply to the papers and to accompanying original drawings and photographs. It will be permissible to include drawings and photographs which have been already published; but, naturally, having been published, no claim for copyright could be made for them. The same statement would apply to drawings incorporated in patent specifications. Where competitors propose to extract drawings or pictures from the works of other people (unless common property through repeated publication), it would be well to secure from the author permission to utilize them, and to state in the paper that the permission has been obtained. A further inquiry has been as to whether competitors are expected mainly to devote themselves to a description of original work or to indicate broadly the lines along which progress may be made. The answer is that the Committee would like them to do both. As to Section III. of the competition, it will be quite competent for competitors who desire to deal only with the utilization of coke and not its sale to do so, because the view is that those who can submit valuable information on the subject of utilization will be contributing material which will promote sales. If any intending competitor who desires further information as to the conditions of the competition will specify what he wishes to know, the Editor of the "JOURNAL" will, if possible, satisfy him.

Continuous Verticals for All Kinds of Coal.

THERE is a disposition when speaking of a system of continuous vertical retort construction to regard it as having remained without much variation through the years of its presence among the processes of the gas industry. That is, of course, a mistake. Fundamental principles may be much the same; but there has been silent development, through trial and experience, in the details, which has raised efficiency and enlarged the range of application in a notable degree. A change in detail, without touching radical principles, sometimes makes an enormous difference in the efficiency of a process. We saw that when the weights of charges were increased in horizontal retorts. We see it again to-day in connection with continuous vertical retorts. Effective modifications of the kind mean advance. Suitable opportunity of illustrating this is given by the Oldbury installation of Glover-West verticals, which were inaugurated last Wednesday. It incorporates a type of retort whereby there can be larger throughput without loss of steaming and general efficiency, and therefore a gain in productive capacity. What also is very important is that highly bituminous coal—such as the Durham coals so largely carbonized in the South of England—can be treated without the lodging-up of which there has been complaint on the part of some managers. At one time there were engineers who considered this trouble unpreventable; others believed it merely a matter of the use of proper temperatures. But experience suggests that the shape of the retort is likewise not an insignificant matter. It is, of course, not difficult to make a vertical retort of large capacity for carbonizing coal; but it has been a problem to construct a large retort of proper shape through which any kind of coal can be passed without difficulty, and be efficiently carbonized. In the Glover-West type of retorts, the elliptical shape has been for many years accepted as correct; but it was found from experience that there must be no rapid changes in the major sides of the ellipse in the descent of the retort, as this gave rise to spaces between the charge and the retort wall, with consequent and obvious inconveniences. These were obviated by the construction of a constant curvature in the major sides. To obtain good steaming results the prevention of spaces between the charge and the retort is very necessary. The knowledge gained as to the practice of steaming also led to what is known as the "New Model" retort, which was an extension of the 33 in. by 10 in. by 21 ft. retort to 25 ft. long, by adding at the base of what is called the steaming chamber, the function of which is to provide a zone in which the hot coke is available to raise the temperature of the steam to that of dissociation before it reaches the retort proper—thus securing the advantages of steaming without deducting from the heat necessary for dry distillation in the retort itself. This change which occurred some four years ago raised the carbonizing capacity of the retort by some 50 p.ct. per day, and the production of gas was increased from 50 to 100 p.ct. per day. That represented progress.

Now there has arrived the larger retort. It is the latest advance in the Glover-West system, and is exemplified in the retorts at Oldbury. In this are found the new prin-

ciples already mentioned, but the major axis of the elliptical retort has been increased from 33 in. to 40 in.; and through this the therm-producing capacity has been increased to no less than 423 therms per day. That is important; and so is this: Tests on a retort of this size on the works of West's Gas Improvement Company have proved conclusively that Durham coals can be carbonized and steamed, so that gas of any desired ordinary quality can be produced—say, 510, 475, or 450 B.Th.U. per c.ft. This can be done efficiently without unduly slowing-up throughput, but increasing the thermal output of the retort, and without adding to the inert content of the gas. Therefore, there need now be no question of having to select coals for continuous vertical carbonization with steaming. The retorts will deal with Scotch coals, Durham, Yorkshire, and Lancashire coals, or coal from any other part of the world. The 40-in. retort has been adopted for a considerable installation in London and for certain other plants; and there is no question that it will continue to receive favour from those who select this system—particularly for the larger installations.

Enough has been said to show that shape and size of continuous vertical retorts play a material part in efficient working with coal whatever its physical characteristics, and that those two factors when properly determined have an eliminating effect upon some of the pre-existing limitations of the system. While on the subject of this type of retort, however, there are a few other points upon which criticism is raised from time to time to which reference may be made. There have been indictments as to the quality of the coke being impaired through steaming. The contention of those who have been responsible for the development of the continuous system of carbonization is that, if it is dry carbon that is required for efficient heating, then for domestic purposes vertical retort coke is on a par with the coke from any other system. On the Continent coke has a large vogue for household central heating; and it is not at all likely that gas suppliers there would adopt a system of gas manufacture which gave them a coke unsuitable to satisfy local requirement. Take the Copenhagen Municipality. They have had at their Eastern Works a Glover-West vertical retort installation of a productive capacity of 3½ million c.ft.; and they have now contracted for a plant of the same size for their Valby Station—all working on Durham coal. Then as to the economic efficiency of making water gas in the vertical retort. Criticism is sometimes made of the utilization of coke in this way; but the matter has to be considered from the point of view of relative efficiency with the separate production of water gas. One can make with separate plant water gas to add to coal gas with an expenditure of close upon 50 lbs. of coke per 1000 c.ft., or by exact methods it may be brought down to about 35 lbs. Time after time tests on the Glover-West continuous vertical retorts have shown that in them the expenditure of carbon per 1000 c.ft. approximates 16·8 lbs., and that is usual practice. This means that if 20,000 c.ft. of mixed gas is being made in a vertical retort, the expenditure of coke would be about 1 cwt. for the added 7000 c.ft. of water gas, instead of nearly three times that amount of coke making the water gas separately. Moreover, in a modern vertical retort plant, the steam required is always raised by the waste heat of the settings; so that the actual total expenditure of coke for the water gas is the 1 cwt. or so (previously mentioned) per 7000 c.ft. within the retort itself.

Another point which has from time to time been raised in discussions on carbonizing plant is the capital cost for continuous verticals. The therm has supplied a safe basis of comparison. We have before us the capital costs for the construction of three different sizes of plant—large, medium, and small—with the elliptical retort and inclusive of coal and coke handling and waste-heat recovery plant. In the case of an installation capable of making 37,000 therms per day, the capital cost works out to £3 4s. per therm per day. For the medium-sized plant, with a capacity of 8600 therms per day, the cost works out to £4 16s. per therm per day. For the small plant, which has a capacity of 3500 therms per day, the cost averages £5 per therm. Then it is often found that labour is a subject of comment. In the instance of the large plant (which is making gas of 510 B.Th.U. as against 480 B.Th.U. gas in the other two cases), the number of therms made per man per day is 1200. But in the medium-sized plant (more therms being produced per ton of coal), the number of therms made per man per day is 1440; while with the small plant the output per man per day is 1150 therms. Anyway, it may be taken that a fair average is about 1200 therms per man per day.

In all these matters, however, results depend very much upon the degree and character of the supervision afforded. One must admit that the continuous vertical plant is a more scientific instrument than the older types of carbonizing plant; and no fair judge would be prepared to say that a continuous vertical retort plant is any less easy of management than any other type. But what can be claimed is that the more scientific instrument which has been provided in the continuous vertical retort plant responds much more generously to capable management than its precursors. In other words, the largest efficiency can be obtained when the more competent plant is under the direction and control of a highly efficient engineer.

Finally, there is the question of wear and tear, which was so effectively dealt with by Mr. W. Buckley, of the Droylsden (Manchester) Gas-Works, in the paper which he contributed to the meeting of the Manchester District Institution of Gas Engineers in May, 1923. When one considers the simplicity of the mechanical portion of continuous vertical retort plant, it is easy to see that the ultimate maintenance and wear-and-tear costs should not exceed those for other systems, particularly where there is efficient supervision and control.

These several reflections have been raised by the new plant at Oldbury, which marks the latest stage in the development of one of the prominent systems of continuous vertical retort operation. Notwithstanding all that has been said, there will still be adherents among gas engineers to horizontal retorts which have served them well, and are still doing so.

Industrial Gas Men.

We are glad to see the amount of spontaneous interest that is being taken in the Industrial Salesmen's Circle, which is the latest of the lively progeny of the "B.C.G.A." It has had an excellent start; and with the goodwill of gas engineers and managers in large industrial centres, we are sure a fine impetus will be given through the members to the utilization of gas for industrial purposes. Knowledge of what others are doing promotes not only emulation but a desire to do something more—at any rate, it does if the right men are in the right places in this as in other forms of business enterprise and activity. Much has been done by the gas industry in the promotion of the utilization of gas in manufacturing work. But when one considers the quantity of coal still used in industry, the fact dawns in the mind that the amount of displacement of raw fuel that gas has so far made in industry is comparatively small. Thus it is a field for which it is worth while to make a large bid. Therefore one thing that should appeal to gas undertakings in industrial areas is to do all possible to foster the promotion of knowledge among salesmen who deal specially with the exploitation of gas among manufacturers by facilitating the opportunities for conference and for investigating what different undertakings are doing. The Chairman (Alderman Ratcliffe) and members of the Leeds Corporation Gas Committee and their General Manager and Engineer (Mr. C. S. Shapley) have shown their interest, *ab initio*, in the new movement of an Industrial Gas Salesmen's Circle; and now we see that the General Manager of the Birmingham Corporation Gas Department (Mr. A. W. Smith) has invited the Circle to hold the next meeting in that city. It was in Leeds that some fifty industrial gas salesmen held their second meeting; and largely through Mr. Shapley's enthusiasm for the cause, the meeting was a great success, as testifies the space devoted to the report of the proceedings in "The Gas Salesman" issued to-day. The items in the programme, local and contributed, gave to the meeting particular interest and large educational value. The Leeds Gas Department possess some well-organized and highly interesting industrial

showrooms. Perhaps "showrooms" is not a sufficiently comprehensive title. They are something more than that, because the Gas Department encourage local manufacturers to utilize the showrooms and laboratories for the purpose of conducting experiments, making tests, &c., with a view to solving the problems which are constantly arising in the application of gas to industrial purposes. That is a method of service which cannot fail to bear good fruit. The Department are to be congratulated upon the very sound and complete organization of this particular section of their activities. The inspection of the showrooms and the character of the work that is done in them was the subject of research by the visitors, who took a very keen interest in what they saw and heard. This confirms the value of visits which enable the broadening of views by seeing, and hearing of, what others are doing, and by giving occasions for discussion between men engaged in the same business pursuits. Reference must be made to the report in "The Gas Salesman" for information as to the papers read and the general tenor of the discussions. They were all good; and there is material in hand for consideration at the next meeting. What, however, we desire to impress most of all in the "JOURNAL" is the importance of this industrial gas movement, and, when this is recognized everywhere, the Circle will never lack encouragement to work from success to success. The field is large; the time opportune.

Benzole Research.

BENZOLE research is proceeding apace—energetically and along practically beneficent lines. This was disclosed by the President of the National Benzole Association (Mr. D. Milne Watson) at the annual meeting of the members last Wednesday. We are limited—and naturally—in our notice of the work of the organization to the technical activities of the Joint Benzole Research Committee of the Association and the University of Leeds; but that suffices, because the development of that work is to the future commercial advantage of benzole, whatever may be the conditions prevailing at any time. Before noticing the directions in which work is being prosecuted as adumbrated by the President in his address (published in part later in this issue) and as revealed by the annual report of the Joint Committee which will be the subject of a review in our columns later on, it may be well to remind readers that the Joint Benzole Research Committee was formed some three years ago. It was really modelled upon the long-existing Joint Gas Investigation Research Committee of the Institution of Gas Engineers and the University of Leeds, and the appointment was intended to serve (as it is doing) the interests of those immediately concerned in benzole. Indeed, it may fairly be claimed that it was the success of the Gas Investigation Committee which led to the establishing of the Benzole Research Committee. For this body there is unlimited scope for research; the most cursory glance at the position confirms that. The motor spirit market is so much more extensive than we can ever hope to supply from coal by known methods, and yet the country must, in times of emergency, be as self-reliant and secure in respect of the provision of motor spirit as it can be made. Our politicians are apt to overlook this aspect of our needs while peace reigns and the seas are open. Moreover, emergencies do not arise only in times of war, but they may become more frequent and more serious through internal industrial causes, with the growth of understandings, alliances, and so forth. The Benzole Research Committee are therefore, from all points of view, engaged on work of national importance. Further, however, as to scope. The Benzole Association is very comprehensive in respect of interests, because apart from gas undertakings, it includes the bye-product industry, and through it the big steel firms, as well as the tar distillers. For all these interests, the research work is carried on, under the supervision of Professor John W. Cobb, in the laboratories of the Leeds University, or in industrial establishments wherever it becomes necessary.

Glancing for the present somewhat casually through the second annual report of the Research Committee and reading the statement of the President, it is seen that both in matter and in detail the volume is of considerable value; and it shows that the Chief Research Chemist (Mr. W. H. Hoffert), working with Prof. Cobb and the Committee, is pursuing the investigations with the thoroughness characteristic of Leeds University. The directions in which the principal work has been proceeding have obviously three objectives. First, there is the desire to produce the ultimate simplification and economy in the recovery of benzole; secondly, there is the provision of a motor spirit which will give, within economical limits, the utmost potential value to the user; and, thirdly, there is the question of benzole being prepared in such manner that all destructive tendency shall as far as possible be eliminated. In these objectives we see work going forward that is to the joint interest of both producers and users. Much, for example, has been published regarding the use of solid adsorbents—such as active carbon and silica gel—for the removal of the constituents of benzole from gas. There have been many statements published as to the economies and efficiencies to be derived from the use of such adsorbents. But what has been said has been more general than particular; and usually has come from those interested. Those interested, however, have shown good desire to have their claims put to independent investigation. Hence the systematic examination which the Joint Research Committee are making has not been confined to laboratory work (though under defined conditions resembling those of industrial practice as far as these can be reproduced in the laboratory), but the Committee sent Mr. Hoffert on a mission to France and Germany to investigate the use of active carbon for benzole extraction in working conditions—the performance of both that substance and silica gel in the laboratory having proved that investigation on a full working scale was amply justified. The work does not end there. Conditions vary. The conditions affecting or influencing the functioning of the adsorbents require critical exploration; and this is being done. There is not only great interest but possibility in this work; but more as to what is in hand or has been accomplished when we come to review the annual report of the Research Committee.

The results obtained by the new processes to which reference has been made, and considerations respecting the output of motor spirit by the older processes, have pointed to the desirability of establishing more firmly and rationally what are the essential requirements of a motor spirit, and the lines of the specification which should be drawn up to meet them. Other investigation has been directed to the devising of a test which can be relied upon to give a clear indication of the liability of a commercial benzole to form a sludge on standing, or a gummy deposit on valves or other parts when used in an internal combustion engine. Another subject of research is the activity or inertness of different benzoles in causing the corrosion of copper.

There is no question the Committee have operated with very valuable effect during the past year; and we can see from what has already been accomplished that the work will expand with excellent advisory and enlightening results, to the advantage of the benzole motor spirit industry, its patrons, and the country generally.

DEATH OF
Mr. H. E. JONES.

As we were about to begin the printing of this "JOURNAL," the news reached us by telephone that Mr. H. E. Jones passed away suddenly yesterday. The news will be received in the gas industry, as it has been by us, with profound sorrow. A long life of full service in the industry has ended; a figure has been removed which we all revered; a staunch friend has departed. He was active to the last, taking an interest in business and private matters to within almost the hour of his death. He simply stepped from life (as has recently been said of another) to the "great ordeal" with the courage and fortitude which had always been characteristic of him. It was a happy ending. Time will not permit of more being said to-day of one who was great in our industrial world.

Gas Workers' Wages.

There has been a further conference at the House of Commons of the Executives of the Unions involved in the deadlock which has arisen over the demand for higher wages and other consideration in the gas industry. Nothing further of material importance has been allowed to leak out regarding the dispute. But it was agreed that the workers' representatives on the Joint Industrial Council should accede to the request of the employers' side to attend a meeting to adopt the annual report and balance-sheet. Reports were submitted by the various regional representatives; and there was discussion as to future steps. A further conference is to be called after the meeting of the Joint Industrial Council. Meantime the representatives will utilize the opportunity of further consultation with their unions.

"Direct" Drainage into Fisheries.

There is likely to be some misconception on the part of road authorities regarding a letter which has been addressed to them by the Ministry of Transport on the subject of the risk to freshwater fisheries by washings from tarred road surfaces. There is confidence that the Ministry do not wish to imply that they prefer in localities near fisheries that bitumen or bitumen compounds should always be used in preference to tar or tar compounds. The letter calls attention to a circular which was sent out by the Ministry in May, 1923, and which, to put the matter briefly, recommended the use of asphaltic bitumen free from tar products for the treatment of roads draining directly into fishing waters. The word which it is important should not be overlooked is "directly," as it makes all the difference to any idea of partiality on the part of the Ministry of Transport. But their recent letter casually read, without a careful perusal of the circular of nearly two years ago, might lead one to suppose that, in the opinion of the Ministry, the washings from tarred road surfaces, whether draining directly or indirectly into fishing waters, were injurious. There is no foundation for any such belief. Since the circular of two years ago was issued, the Ministry of Transport have themselves agreed with the National Gas Council standard specification for tar for roads and highways; and furthermore no differentiation is made, in respect of grants from the Ministry, between proposals embodying the use of tar or tar compounds on the one hand or bitumen or bitumen compounds on the other. Every opportunity should be taken to explain the position to those who are concerned in the construction and upkeep of roads, because it would be a pity to allow a false impression to spread.

Poor Rate Assessments.

Gas undertakings proposing to appeal against their poor rate assessment should serve carefully worded notices of objection upon the proper authorities by the end of the present month, if any reduction is to be obtained on the current rate.

Electric Heating.

The electrical people are finding themselves between three stools in this matter. They are beginning to learn that a seasonal and intermittent load of the kind is not, at the prices they have to charge for the energy, so profitable as they had hoped it would be. Then they have complaints from consumers. Electric heating is expensive any way and at any time. In order to economize, the fashion was to recommend heaters which were too small for the work to be performed. People complained that they could not get sufficient heat. Then there was revision of this procedure; and two and three bar element fires were recommended, so that one, two, or three bars could be used as desired. Experience shows that the consumer after a time does not control the fire according to requirements; he gets into the habit of switching it "full on," in order to feel the heat, and because there is nothing more hideous than to sit before a fire with one bar incandescent, and the other two dead. Thus the consumer when he receives his account is not pleased, and is disposed to show his resentment in a very disagreeable manner.

Why People Yawn.

The electricity suppliers, however, who still stick to the idea that something will happen which will establish electric heating, are pointing to the saving in structural costs that can be effected in house building by adopting electric heating. The same is done, and has been for some time now, with gas equipment. Simultaneously they are ridiculing the claims of gas men as to the ventilating properties of the gas-fire. Ridicule cannot kill facts. Electric heating is so expensive that it can naturally give the best account of itself in rooms designed in a manner to promote stuffiness and insanitary atmospheric conditions. Why do people yawn? asked Professor Kenwood of the London University, in a recent lecture delivered at a meeting of the National Union of Teachers. His reply is found in the statement that experiments have lately established the fact that it is not the accumulation of carbonic acid gas that is the cause of discomfort in a crowded room, or lack of oxygen, or disproportion of any other constituent of dry atmosphere, but that it is due to increase of temperature and of moisture and the stagnation of air movement. It has been established that foul air in overcrowded rooms does not act through our lungs at all, but through our skins. It is not necessary to keep windows open wide to flood a room with air. A very small opening will keep the temperature right, but some people will not deliberately provide even a little means for air ingress. Electric heating contributes to air stagnation.

Coal Shipments.

The low level of coal exports continues. In February, the total shipments of coal of all sorts amounted to 4,344,008 tons. This compares with 5,075,048 tons in February, 1924, and 5,902,630 tons in February, 1923. Values, too, have fallen considerably. For last month the shipments were valued at £4,537,746; in February, 1924, at £6,200,971; and in February, 1923, at £6,847,815. Of the total exports only 568,966 tons were gas coal, as compared with 669,421 tons in February, 1924, and 719,823 tons in February, 1923. The value last month was £584,412, as compared with £813,904 in February, 1924, and £810,836 in February, 1923. The value last month averaged £1 os. 6·5d. per ton. For the two months of this year, the total quantity of coal exported amounted to 8,710,059 tons (the value being £9,246,724); January and February, 1924, 10,515,685 tons (£12,879,848); January and February, 1923, 11,514,300 tons (£13,143,635). In the two months of the year, the quantity of gas coal sent abroad was 1,120,742 tons, as compared with 1,295,488 tons in the corresponding period of 1924, and 1,424,183 tons in the same months of 1923—the respective values being £1,157,130, £1,569,371, and £1,594,832.

Safety in Factories.

A deputation recently waited on Sir William Joynson-Hicks urging the need for the immediate introduction of the Factories Bill. The Home Secretary made clear that it is the intention of the Government to introduce a measure this year. It will be in the nature of a Consolidation Bill; and it is hoped that it will be the means of carrying safety and efficiency in factories very much farther than has been foreshadowed in any of the Bills previously proposed. It is hoped that the Bill will be definitely passed into law either this year or next. In view of the recommendations that were made some time since by the Committee who considered the question of lighting in factories, it will be necessary for the gas industry to keep an eye on the contents of the measure. It has also been noticeable from the reports of the district factory inspectors to the Chief Inspector of Factories and Workshops that there are notions existing among them as to lighting and heating which do not altogether coincide with scientific facts. However, until the Bill has been introduced, one cannot tell whether it will deal with the question of artificial lighting, and if it does, to what extent.

German Gas Association.

The announcement is made in "Das Gas- und Wasserfach" that the sixty-sixth annual general meeting of the Association will be held this year at Cologne on June 8 to 10. Details of the meeting are not yet decided; but they will be intimated in due course, when invitations are sent out to the members.

The Society of British Gas Industries.—The annual general meeting of the Society will be held at the Hotel Cecil, Victoria Embankment, W.C., on Wednesday, May 20, under the presidency of Mr. Milne Watson, D.L. The annual dinner will be held in the evening. The programme of arrangements for the meeting will be announced later.

PERSONAL.

We learn that Mr. G. M. GILL is sailing for New York on April 8, on the s.s. "Olympic," to carry out some investigations and to study the latest methods of gas making and distribution. This will be his second visit to the States.

At a meeting on the 11th inst. of the Board of the Institute of Physics, Dr. G. E. FOXWELL (Chief Chemist and Physicist to the Koppers Coke-Oven Company, Ltd.) was transferred from the class of Associate to that of Fellow (F.Inst.P.).

Major F. CORNELIUS WHEELER, whose work with the Nautilus Fire Company for the past six years has been well known in the industry, has joined Messrs. Wood Russell & Co., of 34, Oxford Street, W. 1, as a partner in the firm.

Mr. A. B. MUNRO, Showroom Manager and Internal Fittings Superintendent to the Burnley Corporation Gas Department, has been successful in obtaining the position of Superintendent of Showrooms to the Edinburgh Gas Department. Before proceeding to Burnley, Mr. Munro had fifteen years' experience in the Distribution and Showrooms Department of the Glasgow Corporation, and secured his appointment in Burnley in competition with about thirty applicants. This position he has held during the last two years. While with the Burnley gas undertaking Mr. Munro has been very successful in the development of business—chiefly gas fires and hot water appliances—and the showroom may be considered to have prospered during his period of control.

OBITUARY.

The death occurred on March 5 of Mr. CHARLES P. MYERS, who for seventeen years held the position of Gas Manager at Troon, prior to which he occupied a similar post at Kirriemuir. His father, we believe, was associated with the formation of the North British Association of Gas Managers; and the late Mr. Myers attended the Association's meetings regularly, and took a keen interest in its proceedings.

ELECTRICITY SUPPLY MEMORANDA.

THE "Electrical Times" has been worrying itself over statistics, ostensibly with the view of showing that gas is proved by them to be more dangerous to the public than electricity.

Statistics.

We will give our contemporary credit for commencing its statement as to the results of its researches with the remark: "Statistics lending themselves to accurate comparison of the accidents due to various causes do not exist, and probably never will exist." It adds: "This is to be regretted, because it is extremely important just now that the relative danger of various public services should be stated clearly and completely." It is plain that our contemporary is not impressed by fire brigade reports, seeing that it refers to them as "notoriously silly." It finds that the only "authentic statistics" available founded on evidence are embodied in the "Registrar-General's Statistical Review of England and Wales;" the latest being for 1923. We may warn the "Electrical Times" as to the danger of utilizing the statistics in the "Registrar-General's Review" as supplying any definite or reliable data upon which any one form of accident can have imputed to it a degree of danger in excess of, or less than, another. For example, in these statistics we have recorded accidental deaths caused by coal gas poisoning, 108, and accidental deaths due to electricity, 25. It is true that later on in the article it is stated that it would obviously be unfair not to make a proper deduction from the total gas fatalities of those occurring in industry. There is ample evidence that the use of the words "coal gas poisoning" is unfair, because the term and the appended figure do include the whole of the industrial accidents caused by producer gas, blast furnace gas, &c. We have this point made in the report of the Departmental Committee on Carbon Monoxide issued in 1921. Among the witnesses they had before them was Dr. Stevenson, representing the Registrar-General's Department. They point out, as the result of the statistics he laid before them, that for the years 1913 to 1919 the number of deaths from gas poisoning was 632, or an average of 90 per year; but they add "how many of these deaths were attributable to the industrial use of gas is not recorded." Of course, no two years are the same in their tale of fatalities, or the distribution of fatalities.

Relative Danger.

Now if we turn to the "Carbon Monoxide" report to the Board of Trade by Mr. W. J. A. Butterfield, issued last year, it is seen that he states that the number of deaths from accidental gas poisoning for the first nine months of 1923 was 56. Therefore, if we take one-third of this number, and add it to the 56, we get a total of 75 for the year. Of course, this is a pure estimate; but assuming it is approximately correct, we should have 33 accidental deaths due to industrial operations. In this country there are, including prepayment consumers, 8¼ million consumers of gas; and if it were permissible to use 5 as a multiplier to ascertain the extent of population supplied by gas, it would be found that over 42 millions of the entire population of this country reside in houses or tenements to which a gas supply is given. However, assuming that the whole of the 108 cases of fatality by gas were attributable to town gas supply, it would only represent 12·7 deaths per million of gas consumers. If, on the other hand, 75 fatalities were chargeable to town gas supply, this would work out to 8·8 per million of consumers; and the 8·8 would represent less than two persons per million of population supplied. We think it will be seen from these figures that no reliance can be placed on the Registrar-General's data, *per se*, for the purpose of estimating relative danger. It is remarked that the accidental deaths due to electricity are placed at 25. Now, can anyone honestly say that this 25 represents the total number of deaths in this country due to electricity in 1923, in view of the fact that the Chief Electrical Inspector for Factories and Workshops alone reported 21 fatal cases occurring within his particular province, which is only one out of several? We know very well that during 1923 there were more than four deaths that occurred in connection with the town distribution of electricity, and in connection with traction. To accept the view that 21 of the deaths occur in factories and workshops, and over all the other electrical distribution and application only four deaths, would be unreasonable and absurd. Research in certain electrical papers would tell a different tale.

Fire Data.

In a subsequent article on the London Fire Brigade Reports, the "Electrical Times" opens by stating that the "authentic statistics" in the Registrar-General's record (to which we have referred in the previous paragraphs) prove that in the year under review over 300 persons were killed in the home by gas, and by electricity 0—the four which its deduction of figures in the factory and workshop electrical inspector's report left from the total of electrical fatalities, our contemporary assumes, occurred in the "open." Whence the new figure of 300 is obtained is not explained. In the former article, it will be remembered, reference was made to the "notoriously silly" Fire Brigade reports. From this one can naturally assume that the fire statistics went strongly against electricity. Our contemporary has been studying "London Statistics" for 1922; and it finds that those figures—taken from the "notoriously silly" reports—show there were twelve fatalities in London due to fires caused by gas, while electricity did not show a single fatality. But, on the other hand, the fires attributed to gas numbered 128, and to electricity 170. This shows why the reports are considered "notoriously silly." However, the two figures represent a remarkable comparison in view of the enormous preponderance of consumers and points of use of gas as compared with electricity consumers and points of use. Just consider 170 fires for electricity spread over the number of premises supplied, while gas has only 128 spread over an enormous number of premises, consumers, and population! Of the total fires in London in the same year, there were 137 the origin of which was unknown to the Fire Brigade. Probably, had not the cause been obliterated by the fire, it would have been found that the 170 fires definitely attributed to electrical origin should have been increased. Electricity has an insidious way of working. When statistics go against electricity, then according to our contemporary they are "not only incredible, but fantastic."

Competition in Sheffield.

There is keen competition in Sheffield between the Gas Company and the Electricity Department. Nevertheless, the Gas Company are proud of their trading results. As Colonel H. K. Stephenson pointed out in his annual address to the stockholders, gas in the city is not only holding its own as an illuminant, but is gaining ground. For cooking and heating electricity cannot get near gas, either in cost or efficiency. Last year, the Company sold upwards of 22,560,000 therms at a cost to the consumers of £591,190. To replace that number of therms by electricity, the cost would have been nearly six times as much based on Sheffield charges, which average 1·261d. per unit. As was seen in a criticism made in our editorial columns last week of figures published in the "Electrical Times," the electrical people do not like these thermal and cost comparisons. They are too substantial and too emphatic to be wrecked by mere commonplace assertion, which is what our friends indulge in because there is nothing of a more solid nature at hand. Last year, too, the Company connected up 8000 prepayment installations, and have 3000 more in hand; and the tide of new appliance connections continues to flow with a persistence which exhilarates. Touching the competition, the Corporation Electricity Supply Committee asked the Council recently for sanction to take a 21 years' lease of premises in Fargate for demonstration purposes, at £1500 a year, and to spend £2200 on alterations. There was strong opposition in the Council—more apparently on the ground of unsuitability of premises than from hostility to show and demonstration rooms. There were also references to economy. The upshot was that the recommendation as to leasing the premises for electricity demonstration purposes was referred back to the Committee.

MURDOCH LODGE, NO. 3480.

The Annual Festival of the Murdoch Lodge, No. 3480, was held on Thursday last, at the Imperial Hotel, Birmingham. The Lodge was opened by the retiring Master, W. Bro. R. J. Milbourne, J.P., P.P.G.P. (Salop), who, having completed his year of office, duly installed his successor, Bro. Lt.-Col. W. R. Glover, C.M.G., D.S.O. (S.W.). The newly installed W.M. then proceeded with the appointment and investiture of his officers. The complete list of officers of the Lodge for the year 1925-6 is as follows:

W. Bro. Lt.-Col. W. R. Glover, C.M.G., D.S.O.	W.M.
W. Bro. R. J. Milbourne, J.P., P.P.G.P. (Salop)	I.P.M.
W. Bro. R. P. Vale, 560	S.W.
W. Bro. H. V. Stanton, P.P.G.O. (Worcs.)	J.W.
W. Bro. H. J. Woodfine	Chaplain.
W. Bro. Frank Jervis	Treasurer.
Bro. R. J. Meiklejohn	Secretary.
W. Bro. S. O. Stephenson, P.P.S.G.D. (Sussex), P.P.Asst. G.Sec. (Worcs.)	D.C.
Bro. W. A. Twine	S.D.
Bro. J. Brettle	J.D.
W. Bro. R. Scott	Asst. D.C.
W. Bro. Vincent Hughes, P.P.A.G.D.C., P.P.G.P. (Staffs)	C.S.
Bro. J. R. Duff, P.P.G.Org. (Oxon.)	Asst. Sec.
W. Bro. P. Bale Rider, L. R.	Organist.
Bro. W. G. S. Cranmer, J.P.	Asst. Organist.
Bro. C. C. Barber	I.G.
Bro. L. G. Wilkes	Senior Steward.
Bro. T. H. Poulson	Junior Steward.
Bro. J. H. Burrows	Asst. Steward.
Bro. A. Mackay	,, ,,
Bro. T. F. E. Rhead	,, ,,
Bro. E. B. Tomlinson	,, ,,
W. Bro. E. S. Stamp, 473	,, ,,
Bro. W. Littler	Tyler.

COAL AND COMMON-SENSE.

[Extracts from a Paper read by Mr. J. M. A. Mitchell before the Newcastle and Gateshead Gas Company Officials' Guild on Feb. 16.]

At the commencement of this paper, which is really a criticism of "Coal and Power," the report of the inquiry presided over by the Rt. Hon. D. Lloyd George, the author confesses exasperation at finding the popular panacea—*i.e.*, electricity for every purpose—of the ill-informed journalist and technically ignorant social reformer and politician given pride of place in what purports to be an impartial and scientific survey of the whole problem. The gas industry suffers from this lack of knowledge and balanced judgment; and, as Mr. Mitchell rightly emphasizes, public opinion is by no means a thing to be neglected. He instances the chapter on "The Place of Electricity in Modern Life," which he describes as being more noteworthy for its omissions and lack of depth than for what it actually says. As the author remarks, the suggestions put forward can easily be controverted in detail. Instead of doing this, however, he contents himself with a common-sense view of the most economic use of coal.

It is a truism that our national prosperity is built upon coal. To our abundant supply of coal, the invention of the steam engine, and the application of coal (or coke) to metallurgical processes, we owe our industrial supremacy during last century. Since coal is such an important factor, let us see what we do with it. In 1922 we raised 250 million tons. Of this we exported 25·7 p.ct., and used or sold for bunkers 7·3 p.ct., a total of 33 p.ct., so that one-third of the output, though essential to our prosperity, cannot be touched by coal conservation schemes, unless by their means we can cheapen the cost of production of coal at the pit-head. Of the remaining two-thirds, 8 p.ct. was carbonized in coke ovens, and 10 p.ct. in gas-works, a total of 18 p.ct. Electricity generating stations used 4 p.ct., or only 40 p.ct. of that used in gas-works. No less than 23 p.ct. was used for domestic fuel, and 3 p.ct. as miners' coal, so that these together account for over one-quarter of the total home consumption, and equal to more than 2½ times the quantity used in gas-works—the gas industry's first field for expansion is at their doorstep. Colliery engines used 10 p.ct., and railway companies' locomotives 7½ p.ct., while chemical works, mechanical transport, food and drink factories, &c., using coal more or less directly and not for machinery, took 8½ p.ct. We have accounted for approximately three-quarters of the total home consumption; and of the remainder, engineering and shipbuilding take 12 p.ct. The textile industries take over 4 p.ct. mainly for power, and the remainder goes to the building and miscellaneous industries.

Taking this home consumption of coal, I submit that it makes a fundamental difference whether it is to be used ultimately for power or for heat. If we except from consideration the coal carbonized in coke ovens or at gas-works, that used at electricity stations, and that used in chemical industries—a total of nearly 42 million tons—as being already adequately treated, and then note that over 42 million tons are used for domestic purposes, entirely for heating, we are left with 80 million tons, of which we may say as a rough estimate that one-eighth is used for heat and seven-eighths for power. Adding this 10 million tons to our domestic total, we may say that roughly 58 p.ct. of our untreated coal is used for heating, and 42 p.ct. for power. I agree that the problems of the most economic way of using coal for the two purposes must be considered together; but it is nonsense to put forward a proposition as a solution of the power problem, and then say that incidentally it will solve the heating problem as well.

The question of power is essentially a problem of the heat engine as a prime mover, and the distribution of the energy thereby generated. Electricity is not a prime mover—it may be likened to shafting connecting the machine to be driven to the engine driving it. The source of energy is in the expansion of the water into steam by the heat of the boiler furnaces, or in the expansion of gases in the cylinder of the internal combustion engine by the heat of the explosion. The heat engine, however, is an apparatus of comparatively low efficiency, so much so that Mr. David Wilson, then Technical Adviser to the Coal Controller, stated a few years ago that the electricity from the central generating stations in this country was produced at an average thermal efficiency of 8·5 p.ct. Over a large number of stations the average was only 6·8 p.ct.; at the 40 best it was 11·5 p.ct.; and the best was 13·05 p.ct. It is claimed for the proposed super stations that they will be capable of an efficiency of 19·6 p.ct. At this efficiency, allowing for transmission and motor losses, the brake horse-power supplied to the consumer would be at an over-all efficiency from coal to machine of 15·9 p.ct., which is not as high as that obtained from a gas engine and the best modern gas-works practice. If the problem were purely one of fuel economy, therefore, it would be best to distribute power by means of gas engines at the individual works, fed by conveniently placed gas-works; and if coal was so dear as to make its saving the prime consideration, no doubt we should incline to this solution. The cost of the power at the machine, however, is the deciding factor; and this is determined by, in addition to the cost of the coal, capital and distribution cost. For direct drives, there is nothing yet to beat the gas engine, both for efficiency and economy.

This leads at once to the proposition: Why not use gas engines in the super power stations? A heat efficiency of 27 p.ct. is readily obtainable with a good gas engine, and 75 p.ct. with a good gas producer, a combined efficiency of 20 p.ct., which can be easily exceeded in the best modern practice. (I may remind you that the 19·6 p.ct. efficiency of the projected power stations is that hoped for, not that already realized.) To my mind the three difficulties are capital cost, finance, and organization. The mechanical difficulties of making sufficiently large internal combustion engines are being rapidly overcome; but their capital cost, combined with the cost of the producers, has discouraged their use, and even when coke oven gas is available, it is generally used *via* boilers and turbines. It is here that we begin to interlace with the other national problems of coal utilization that of the best method of dealing with the 58 p.ct. or thereabouts of our raw coal consumption which is used for heating.

To transmit the heat from the coal to the point of use electrically would not save fuel, and would cost a fabulous sum. According to a report of the Fuel Research Board (Paper No. 3, 1921) the average efficiency of an ordinary coal grate is about 20 p.ct.—rather more than is hoped for from the super stations, without taking into account transmission and conversion losses—while the worst pattern, the almost obsolete open Lancashire kitchen range, averages 9 p.ct., or about the same as the present average of electric generating stations. For water heating, the old kitchen range will reach 17 p.ct. and a modern independent kitchen boiler 33 p.ct. on coal and 43 p.ct on coke. A works steam boiler will average 60 p.ct. heat efficiency, and 80 p.ct. can readily be obtained. Saving of fuel by the proposed electric transmission is therefore impossible; and as to cost, it need only be pointed out that a ton of coal at 12,000 B.Th.U. per lb. contains as much heat as 7878 units of electricity, and that electricity would have to be sold at 0·06d. per unit to equal coal at 40s. per ton, taking super power station efficiencies at 19·6 p.ct., and coal grate efficiencies as above, and allowing an electricity conversion efficiency of 100 p.ct.

Now let us consider the thermal efficiency of gas production. When coal is distilled in a gas-making plant, a proportion of its heat is used up in the process of producing the gas, coke, tar, liquor, retort carbon, sulphur, &c.; and to get at the exact thermal efficiency of the process, we should apportion the heat used up and lost among these different products. As we are unable to do this, it is usual, in order to get comparative figures, to debit all the heat loss against the gas produced. This gives the thermal efficiency of gas production. The thermal efficiency of the whole process is arrived at by adding together the heat units contained in the gas, coke, tar, liquor, &c., and comparing the total with that of the heat units in the original coal. Some examples given by Mr. Alwyne Meade, in 1921, are as follows: With straight coal gas, from horizontal retorts, using coal of 30 million B.Th.U. per ton, the total heat available in the gas produced was 6·7 millions, in the coke

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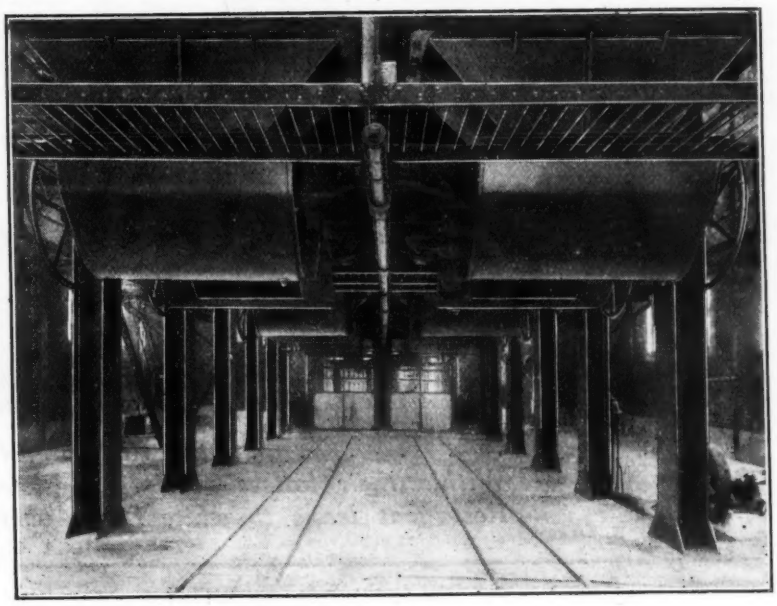

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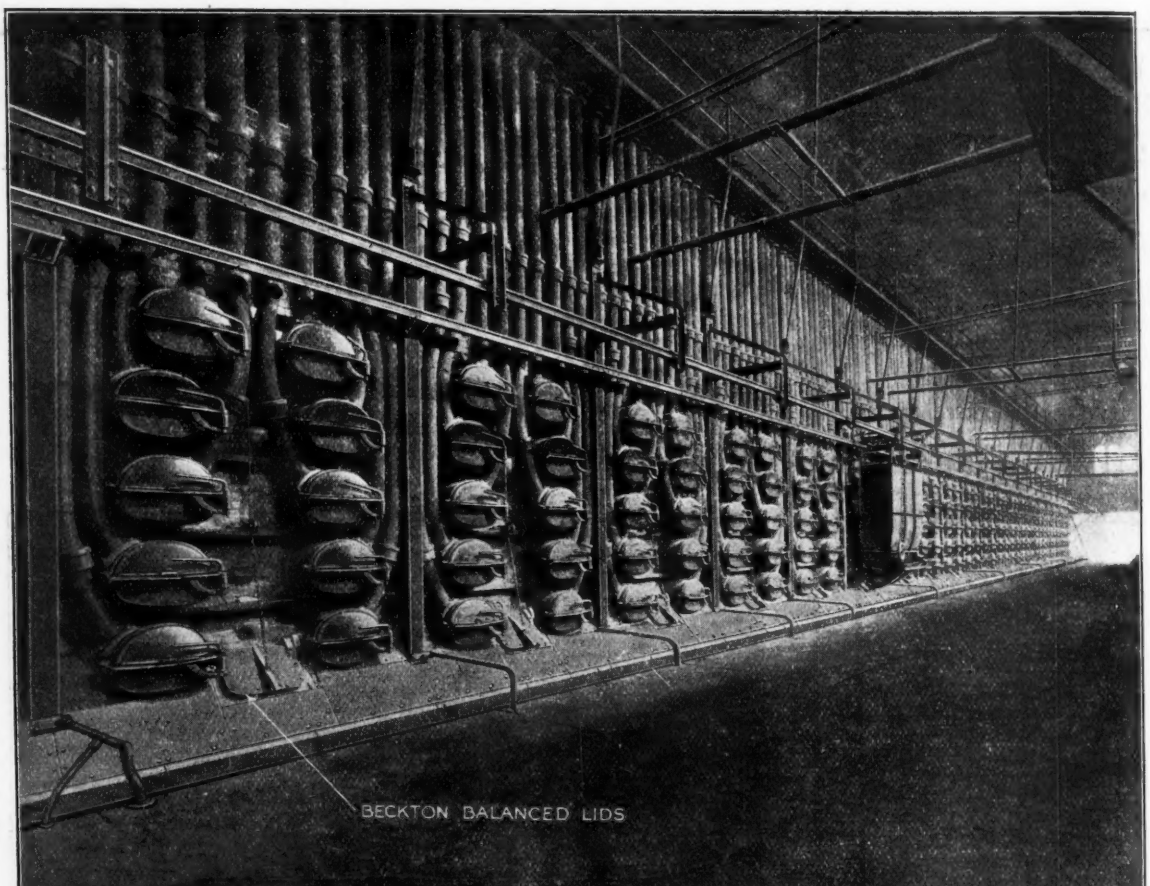

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18·6 millions, in the tar 2 millions, and in the liquor, carbon, and sulphur, 250,000 B.Th.U. From the coke made, 3¾ million B.Th.U. were used to heat the retorts, so that the thermal efficiency of the whole process works out at 82·2 p.ct., and of the actual gas production 52·7 p.ct. An example of steamed verticals shows 81·3 p.ct. for the whole process and 55·1 p.ct. for the gas produced (at 445 B.Th.U.); and one for a complete gasification plant, 63·2 p.ct. for the process and 60·1 p.ct. for the gas. Against this latter has to be set the fact that the gas was only 374 B.Th.U., and would cost more to distribute.

There is therefore no question but that there would be a saving in fuel effected by carbonizing the coal required for heating purposes; and the problem becomes one of cost of manufacture, distribution, and finance. It is extremely unlikely that finality has been reached in the process of lowering the cost of manufacture, but the cheapening of distribution costs is a serious problem, particularly at the stage when gas is making progress in the displacement of solid fuel, and a new gas and more of it has to be forced through the old pipes, or expensive relaying undertaken. It will be seen, too, that a balance will one day have to be struck between the amounts to be distributed as gas and as coke. Fortunately, the water gas plant and the method of steaming vertical retorts provide a certain amount of adjustment, for the complete gasification processes are rather in the experimental stage. It is obvious that, as gas displaces raw coal for heating, it will, if the process remains as at present, be in the position of continually producing more coke for a continually dwindling market. A solution which has been suggested is to use the coke for firing the boilers of the electric super stations. If the internal combustion engine displaces the steam turbine, however, these stations will themselves be flooding the market with coke. The problem will, no doubt, in a way solve itself, for the public are showing an increasing disposition to use gaseous fuel, and are taking a lot of persuading to use coke, and, as I have indicated, we already have the means of gasifying coke. There is a real danger, however, that, during the process of "muddling-through," vast sums will be spent upon plant which will afterwards prove to be unremunerative, if not useless; and the whole subject calls for much more expert and impartial investigation than it has received at the hands of the Committee whose activities have been reviewed in this paper.

BOILER FEED WATER.

"METHODS and Principles of Water Softening," Bulletin XVI. of the Lancashire and Cheshire Coal Research Association, has just been published by Messrs. H. F. & G. Witherby, at the price of 2s. 6d. net. In this, Mr. N. Simpkin, M.Sc. (Director of Research to the Association), and Mr. A. Dawe, B.Sc., review in a broad manner the supply, softening, and control of boiler feed water. It is essential for the economic working of boilers that a suitable feed water be employed. Frequently, however, unsuitable water is utilized directly for steam raising without previous treatment, with the result that a thick scale rapidly forms in the boilers, corrosion occurs, and scaling and repairs to the boiler become necessary at short intervals. By correct treatment, water which would otherwise cause trouble can in most cases be rendered suitable for boiler feed purposes.

The Bulletin is divided into two sections. Part I. concerns itself with the chemistry of water softening; Part II. discusses water softening plant.

CORROSION.

Very interesting are the remarks on corrosion. The factors causing this, it is stated, may consist of one or more of the following; but it must be recognized that special cases occur due to temporary conditions in the boiler, as a result of which corrosion takes place, while with normal working no pronounced corrosion would occur.

Galvanic Action.—Corrosion may occur owing to galvanic action set up in the boiler, due to the nature of the water or to the slight differences in the composition of the boiler plating itself.

Magnesium Salts.—Among the normal mineral constituents of water, magnesium chloride is probably the most harmful. Though not injurious itself, it decomposes under boiler conditions, yielding hydrochloric acid, which, liberated in contact with the boiler plate, acts as a strong corrosive. Magnesium nitrate acts in the same manner as the chloride. The sulphate, though non-corrosive in itself, reacts with sodium chloride, forming magnesium chloride, which behaves as indicated above. Magnesium sulphate, therefore, in the presence of sodium chloride, must be regarded as deleterious. Even magnesium carbonate may decompose, and it is certainly rarely found to any great extent in boiler scale, magnesium hydrate having been formed. All magnesium salts are injurious in a boiler feed water, especially if other chlorides or nitrates are present.

Iron and Aluminium Sulphates.—Pit waters and surface waters from the neighbourhood of colliery workings are liable to contain iron and aluminium sulphates in solution. Both these salts are particularly corrosive, as they gradually dissociate liberating free sulphuric acid. The acid thus produced, unless neutralized, is liable to set up continued corrosion in the iron plating, as the iron sulphate formed will be again decomposed. Similar corrosion may also occur due to the pollution of a water with drainings from steel works, gas plants, and even from agricultural land, &c. Water may be contaminated by ammonium sulphate, which, though itself a neutral salt, decomposes into ammonia and sulphuric acid, thus behaving in a similar manner to iron and aluminium sulphates.

Dissolved Gases.—Oxygen and carbon dioxide are the principal corrosive agents. Oxygen is usually found up to about six parts (by volume) per 1000 of water at the ordinary temperature. In the presence of moisture and carbon dioxide, oxygen has a strong action upon iron. Special plant is now on the market for the removal, by chemical means, of this dissolved oxygen. Sight must not be lost of the fact that carbon dioxide will be liberated from the decomposition of bicarbonates; and though its action is not definitely known, it undoubtedly acts as a corrosive. Dissolved gases may also include acid gases dissolved out of the atmosphere by rain, especially in manufacturing districts. Such waters should be neutralized before use. Admixture with "temporary hard" water will, of course, tend to effect the same result. Corrosion by dissolved gases is frequently observed in the formation of circular pittings, which may be overlooked unless careful examination of the plates is made.

Grease.—Oil and grease in the water may result in overheating, while the presence of a vegetable oil particularly may result in corrosion, due to the formation of organic fatty acids. Though not so corrosive as mineral acids—*e.g.*, sulphuric acid—organic fatty acids nevertheless possess corrosive properties. Oil and grease, even when present in small quantities, assist greatly in causing priming, and should be removed as completely as possible from a feed water.

Peat Waters.—Waters from peaty districts may cause corrosion due to the presence of acids formed by the decay of the vegetable matter. Calcium carbonate in the water would tend to neutralize the acids formed.

Graphitic Corrosion.—This type of corrosion results in the removal of part of the iron of the boiler plates, leaving a residue consisting of graphite, oxide of iron, silica, &c. The material is so soft that it can be cut readily with a knife, but on first examination it appears perfectly normal. The exact cause of this type of corrosion is not known, but it is probably due to dissolved gases.

BOILER COMPOUNDS.

After dealing with scale formation, the different methods of treating water, and various forms of water softening plant and their control, attention is paid to boiler compounds. The addition of these to the water just prior to its entrance to the boiler is done with the object of preventing the formation of hard scale.

By the careful use of some of these compounds, improved results are obtained and the trouble resulting from scale formation is alleviated to a certain extent. In connection with the use of such compounds, the following points, it is stated, must be considered:

A boiler is primarily for steam raising and not for carrying out chemical reactions. If the amount of hardness in the water is considerable, frequent blowing off is necessary to remove the accumulation of mud; and it is far preferable to soften the water in a plant designed for this purpose.

Where the boiler feed water contains only a few degrees of hardness, the discriminate use of a boiler compound may be highly beneficial, if a water softening plant is not installed.

Some of the boiler compounds on the market are only suitable for certain types of water; and in any case it is advisable to submit a sample of water to the makers for analysis before using any boiler compound.

It is advisable to have an independent analysis made of a boiler compound prior to using it. Many of these "compounds" are of little use, and may even be harmful, being liable to cause corrosion.

As many of the boiler compounds consist principally of low-grade soda ash, caustic soda, &c., together with some organic material such as tannic acid, the price may be far in excess of their actual value. They may contain large quantities of material of no value from the softening point of view.

It is somewhat difficult to keep control of the softening process where a boiler compound is employed, especially if there is a liability to variation in the composition of the feed water.

A series of tables completes a booklet which will be widely read, and which will serve a very useful purpose.

A paper on "Experiments with a High-Speed Gas Engine" was read at Wolverhampton by Mr. A. F. Burstall, M.Sc., last week. It was an account of experiments made at Cambridge University on the "Ricardo" variable compression engine. The author stated that the results showed that a higher efficiency was obtained at higher speeds; but practical considerations such as the increased initial cost and increased wear and tear might limit the application of the high-speed engine. At the same time there was no reason why the speed of the gas engine should not be increased to at least twice the present figure.

GLOVER-WEST VERTICALS AT OLDBURY.

INAUGURATION CEREMONY.

On the invitation of the Chairman (Councillor K. H. Wilson) and members of the Gas Committee, a large company—over sixty in number—assembled last Wednesday at the Oldbury Urban District Council Gas-Works, to witness the inauguration of the Glover-West vertical retort installation, and other new plant, a full description of which appeared on p. 682 of last week's "Journal."

On arriving at the works, the visitors were received by the Chairman of the Oldbury Urban District Council (Mr. Frank Wallace, J.P.) and the Chairman of the Gas Committee (Mr. Kenneth H. Wilson); and under the guidance of Mr. Joseph Poulson, F.C.S. (the Engineer and General Manager), they spent a considerable time examining the new plant, in explaining the details of which valuable assistance was rendered by Mr. Ernest and Mr. Frank West, Mr. Samuel Glover, Mr. R. Sayers, and Mr. R. B. Glover.

At the inauguration Mr. Wallace put into action the lip-bucket conveyor to supply coal to the bunkers of the vertical retort plant. Councillor Wilson then opened one of the valves supplying coal to the retorts, and Councillor W. T. Davies, J.P., C.C., started the motor driving the coke extractor gearing. Councillor Wilson having put the gearing itself into operation, Councillor R. Green, J.P., opened the door of one of the coke extractor chambers, in order to discharge the coke. Thereafter Councillor H. H. Robbins operated the coke hoist to convey the coke to the store; Councillor J. Wortley put a pump into action to supply liquor to the collecting mains, and Councillor M. Clee another to feed water to the waste-heat boiler; Councillor W. J. Copper put into operation the arrangement of automatic control for the water supply to the waste-heat boiler; Councillor A. C. Watson tested the reliability of the automatic warning device on this boiler; and Councillor H. Edwards started the fan to draw the hot waste gases from the settings through the waste-heat boiler for the generation of steam.

Many complimentary remarks were heard during the inspection, and, as will be noted, others were made at the subsequent luncheon. The absolute cleanliness of the plant, with the resultant improved conditions for the men, were much commented upon. This cleanliness, Mr. Poulson finds, gives rise to desire on the part of the men to do all in their power to maintain the plant in first-rate condition. Whitening of the roof was noticed; and the bunkers, instead of being dark and dismal, are coloured a light grey—giving a pleasing effect. Before leaving the works, the party were grouped for a photograph, which is reproduced above.

An adjournment was then made to the Talbot Hotel, where the party sat down to luncheon, with Councillor Kenneth H. Wilson in the chair. After the honouring of the Loyal Toast,

Mr. J. Ferguson Bell said he had many reasons for being pleased to be present that afternoon, and not the least of them was because it gave him an opportunity of renewing friendships formed many years ago. It was his privilege to propose the toast of "The Oldbury Urban District Council." He took it that Oldbury must be a very loyal place, because the Council's motto was "*Vivat Rex*"—"Long Live the King." All present would join with him in the wish that Oldbury might have a long and prosperous life. It was an important place, and played a very big part in the provision of munitions for the war. It had, indeed, achieved fame in connection with a number of industries. Therefore there was no cause for surprise at the desire of the Urban District Council to become a Town Council. With this aspiration he felt keen sympathy; for anything that could be done to raise the prestige of those bodies which carried on the local government of their towns should be done. Mr. Poulson had been Engineer at Oldbury for only about twelve months, but during this time he had given ample proof of his capacity. He had shown himself to be a good Engineer; and the works were a credit to him as well as to the Council. Mr. Poulson's father had been a dear friend of his; and if his sons were anything like him, the Councils for whom they were acting were to be congratulated. Already at Oldbury Mr. Poulson had effected a reduction of 6d. per 1000 c.ft. in the price of gas, and he (the speaker) believed there was another 3d. to come off very soon. This would represent a saving of something like £6000 a year to the consumers. The Oldbury Gas-Works were laid down in 1881 for an output of 40 million c.ft. per annum, and last year the quantity sent out was 191 million c.ft. This showed the importance of the undertaking, which he believed would in the future become more important still to the district.

Mr. Wallace, J.P. (as Chairman of the Council), responded to the toast; remarking that the present population of Oldbury was 40,000, and it was a progressive town. It had been a pleasure to the members of the Gas Committee and of the Council to note the great improvements that had been made in the gas-works; this new installation of Glover-West vertical retorts had brought them right up to date.

Mr. W. B. Hayes, J.P. (the Vice-Chairman of the Council), who also replied, congratulated the Gas Committee upon taking a long view of things, and providing so excellent an installation of gas manufacturing plant as they had seen that morning. Oldbury had always been an industrial town, and was continually progressing.

Alderman J. H. Lloyd (the Chairman of the Birmingham Corporation Gas Committee) submitted "The Oldbury Gas Undertaking," and remarked upon the good fortune of the town in possessing such a Gas Committee Chairman. The plant they had seen that day appeared to be an excellent one.

Mr. Kenneth H. Wilson, responding as Chairman of the Gas Committee, stated that his department was the only trading concern of the Council, and it had always been the aim of the Committee to carry on the undertaking in a manner which would be of advantage to the district. As to the newly-installed plant, the yields which had been obtained in every-day practice fully warranted the choice of system which had been made. They had a plant which was flexible and met all their requirements; it gave better results than anything they had had in the past. In every way, the installation was a great credit to British workmanship. They owed thanks to the representatives of West's Gas Improvement Company for the courteous manner in which they had carried out their duties in connection with the erection of the plant. Also he must express his personal appreciation, as well as the appreciation of the Gas Committee, to their Engineer and Manager. [Applause.] Few of them were aware of the immense amount of time that Mr. Poulson had put in during the twelve months he had spent at Oldbury; and the results achieved were due in no small measure to his efforts. It was to be hoped that he would long remain with them. The Gas Committee had other schemes on hand for the improvement of the undertaking, and he trusted that they would continue to give satisfaction to the consumers.

Councillor W. T. Davies, J.P., C.C., proposed "The Visitors."

The Fuel Research Board.

Sir Richard Threlfall (the Chairman of the Fuel Research Board), in reply, recalled the circumstances in which the Board was formed. He said he did not know who was the first person to suggest that it would be a good thing if there were such an organization; but directly it had been proposed, it was felt that there was only one man in the country who could successfully bring it into being, and that was the late Sir George Beilby. He (the speaker) did not claim to be anything more than a follower of Sir George. Certainly, he heartily supported the therm proposal, because he felt convinced it was a desirable step to take. As practically an inhabitant of Oldbury for the last twenty-six years, no one had the interests of the town more at heart than he had.

Dr. C. H. Lander (Director of the Fuel Research Board), who also replied, said that at the Fuel Research Station it was their duty to investigate the claims of various systems of carbonization; and there they were in a unique position, because if they thought of any "trick" it was possible to play on these systems they were in a position to do it. While they might at times have had certain difficulties with Glover-West retorts, these had been due to the "tricks" they had played on them. The thanks of himself and the Board's staff generally were due to the Oldbury Gas Committee and the makers of the retorts for information placed at their disposal, which had proved of great value to them. They had followed up these retorts right on from their inception to their successful conclusion. They were very grateful for having been afforded an opportunity eighteen months ago of seeing these retorts as they were then, as well as the chance of seeing them as they were now. He felt it was only fair to say how much he admired the way in which the gas industry generally placed the experience gained by one undertaking at

the disposal of another. This was the only way in which real progress could be achieved. The question of the most effective utilization of coal required, of course, a tremendous amount of consideration.

Mr. J. GILL, who was present at the laying of the foundation stone of the original gas-works at Oldbury, expressed the opinion that they now had the best possible system of carbonization.

Councillor R. GREEN, J.P., who submitted "The Contractors—West's Gas Improvement Company," coupled with the name of Mr. Frank West, speaking on behalf of the Gas Committee, said he believed every member was satisfied with the admirable manner in which the work had been carried out. Both materials and workmanship had been "A1," and the nice manner in which the contractors had dealt with the Council had been greatly to their credit. This friendly feeling had enabled them to get over every difficulty, and to-day they had a plant of which they were very proud indeed.

The CHAIRMAN remarked that they were very sorry Alderman Fred West's position as Lord Mayor of Manchester prevented his being with them that day.

Mr. FRANK WEST thanked the Council for the very courteous manner in which they had treated the firm during the whole of the time that the work had been in progress. The contractors had done their best to put in a good plant, and believed they had furnished the Council with one of the finest in the country. The results achieved by it redounded to the credit of the Engineer. As a memento of the occasion, he asked the Chairman of the Gas Committee to accept a silver inkstand, and the Chairman of the Council a silver salver, both suitably inscribed.

Mr. JOSEPH POULSON was then called upon, and thanked Mr. Ferguson Bell for all the kind things he had said. He also thanked the Gas Committee for the great assistance they had rendered him in carrying out his duties, and the Chairman of the Gas Committee for his generous help on all occasions. Under such conditions, the future of the undertaking was assured.

YORKSHIRE AND MANCHESTER JUNIOR ASSOCIATIONS AT SHEFFIELD.

Joint Visits to the Neepsend Gas-Works and the Vickers' Undertaking

One of the leading features of the programmes for the present winter of the Yorkshire Junior Gas Association and the Manchester and District Junior Gas Association was that of last Wednesday, when a joint party of members of the two Associations met at Sheffield, to the total number of some 180, to visit the Neepsend Gas-Works of the Sheffield Gas Company and the River Don Works of Messrs. Vickers, Ltd. It was an all-day gathering; the visitors congregating at the two main Sheffield railway stations at about 10 to 10.30 a.m., and being conveyed from there to the gas-works. The day's proceedings were of a nature which will long be memorable. The arrangements had been made between the Yorkshire Association and the Sheffield Gas Company, to whom thanks are due for their part in securing the co-operation of Messrs. Vickers, Ltd. The Manchester District Junior Association shared the occasion by special request.

Some time ago the Yorkshire Association paid a visit to the Grimesthorpe Works of the Sheffield Gas Company, so on this occasion attention was concentrated on the Neepsend Works—one of the biggest in the country, with a daily output capacity of over 14,000,000 c.ft., and storage for 13,930,000 c.ft. The whole morning was spent in a tour of inspection, under guides appointed by the Company. A description of the works is appended.

THE LUNCHEON.

Afterwards the visitors were conveyed to the big and well-equipped dining canteen at the Grimesthorpe Works, where luncheon was provided by the Gas Company. Mr. Ralph Halkett (General Manager and Secretary) presided, and among those who supported him were Mr. F. H. Robinson (Harrogate), President of the Manchester District Institution of Gas Engineers, Mr. F. J. Chamberlain (Engineer to the Sheffield Gas Company), Mr. Ralph Halkett, jun., Mr. H. H. Collett (Superintendent of the Neepsend Works), Mr. L. Bates (Superintendent of the Grimesthorpe Works), Mr. A. Wyllie (Sales Superintendent to the Company), and other departmental heads. Mr. J. Alsop tendered the apologies of the President of the Manchester Junior Association (Mr. H. E. Stone, of Birkenhead) and of his two Vice-Presidents for their regretted inability to be present. After lunch Mr. Ralph Halkett was introduced to the gathering by Mr. Edward Gillett (President of the Yorkshire Junior Association), though the latter remarked that such an introduction was hardly necessary.

Mr. HALKETT, on behalf of the Directors, offered a hearty welcome to the gathering. He used to be closely connected with the Yorkshire Juniors, and he well remembered some of the pleasant and valuable meetings which he attended. In connection with works practice, it was essential that they should have a proper costing system. It was a most important factor in modern practice. He had been interested in reading Mr. Robinson's presidential address to the Manchester District Institution. It contained much sound information and guidance; and he agreed with Mr. Robinson that constant quality, composition, and pressure were what they all had to get. In the fitting department, too, they must have proper costing and proper organization. They should learn to cost every appliance that was fixed on the district. In Sheffield they knew exactly the number of appliances sent out daily, the grand total, and the cost per appliance. They were thus able to note immediately any weak spot, and rectify it. The Junior Associations were a most valuable factor in the welfare and future progress of the gas industry.

Mr. R. N. WEBB (Leeds), proposing a vote of thanks to the Directors of the Sheffield Gas Company and to Mr. Halkett, said that Mr. Halkett had long been regarded as a great friend to the Junior Gas Associations. He had done great work for them. The visitors had had a most interesting morning. He had been particularly interested in the electrical power house, which was one of the finest installations he had ever seen. He congratulated Mr. Halkett and his staff on the fine balance-sheet which they had been able to put before their shareholders at the annual meeting. It was good to know that, even in times when Sheffield was suffering heavily from industrial depression, the Gas Company could record an increase of rather over 5 p.ct. in their sales.

Mr. C. E. TEESDALE (Salford) seconded the vote of thanks, which was carried with enthusiasm.

VICKERS' WORKS.

The visitors then made their way to Messrs. Vickers' River Don Works, where they were received by Sir George Buckham (on behalf of the Directors) and by Mr. R. A. Skeggs (Chief Engineer of the three Vickers' Works at Sheffield).

The tour of the works, which occupy 90 acres of ground, took up the whole of the afternoon, and even then had to be conducted rather hastily, in order to give at least a rough idea of the many interesting operations and phases of work undertaken by this great firm. Here, as in the case of the Neepsend Gas-Works, the visitors had the advantage of being present on a working day, so that all processes were in actual operation.

The tour began in the magnificent marble-walled entrance hall and offices, and continued through the melting house, the cogging mill, the tyre mill, the forges, the south and east gun shops, the road vehicle and railway springs shops, the drop stamps workshop, and the mills for the production of steel bars, sheeting, and tubing. As the party were returning towards the offices, a completed Army Tank was seen undergoing trials in the yards.

Tea was served to the visitors, as the guests of Messrs. Vickers, in the canteen attached to the offices, Mr. Skeggs presiding.

Mr. GILLETT observed that they had all had a remarkably interesting afternoon, which, together with the morning visit to the Neepsend Gas-Works, would make that day memorable. They owed a debt of gratitude to the Chairman and the Directors of Messrs. Vickers, Ltd., to Sir George Buckham, to Mr. William Clark (Managing Director), and to Mr. Skeggs.

Mr. J. ALSOP (Hon. Secretary of the Manchester District Junior Gas Association) proposed a vote of thanks to the Directors and to Mr. Skeggs; and this was seconded by Mr. J. W. LEE (Chesterfield).

Mr. SKEGGS, replying for the Directors, said he was greatly obliged for the way in which the thanks of the gathering had been expressed. The Vickers Company, he said, was established about 1780. The works had grown, within his own experience there of a little over thirty years, to about three times the size they were when he began with the firm. During the war they employed about 14,000 men and women. Now the work was chiefly for men, and they employed about 6000.

Sir GEORGE BUCKHAM said that, if the Associations should in the future wish to re-visit the works, the firm would do their best to make arrangements.

NEEPSEND GAS-WORKS, SHEFFIELD.

[A Description Prepared in connection with a Joint Visit of the Yorkshire and Manchester District Junior Gas Associations on Wednesday, the 18th inst.]

The Sheffield United Gas Light Company was formed in the year 1844 by the amalgamation of the two companies who supplied the district with gas. The works were situated at Shude Hill (built in 1818, and now occupied by the Company's offices, &c.), and at Effingham Street (built in 1835). In 1850 the Town Council started a Gas Consumers' Company, and built a works at Neepsend in 1852. In 1853 this Company applied for an Act of Incorporation, but eventually agreed to amalgamate with the old Company. In 1917 the title of the present Company was shortened to the Sheffield Gas Company.

The Gas Regulation Act was adopted in March, 1921, and a calorific value of 480 B.Th.U. was declared. The value was raised to 500 B.Th.U. in 1922.

STATIONS AND DISTRICT.

The manufacture of gas is carried on at three works having a combined total capacity of 22½ million c.ft. per diem, made up as follows:

	C.Ft.
Neepsend	14,500,000
Grimesthorpe	10,000,000
Effingham Street	2,500,000
Total	27,000,000

In addition to this, coke-oven gas to the extent of 5 million c.ft. per diem is available, making a total maximum production equal to 32 million c.ft. per diem.

The chemical works are situated at Grimesthorpe, and include

sulphate of ammonia and sulphuric acid plants which deal with the whole of the liquor and spent oxide from all three works.

Storage to the extent of 21½ million c.ft. is provided at four stations:

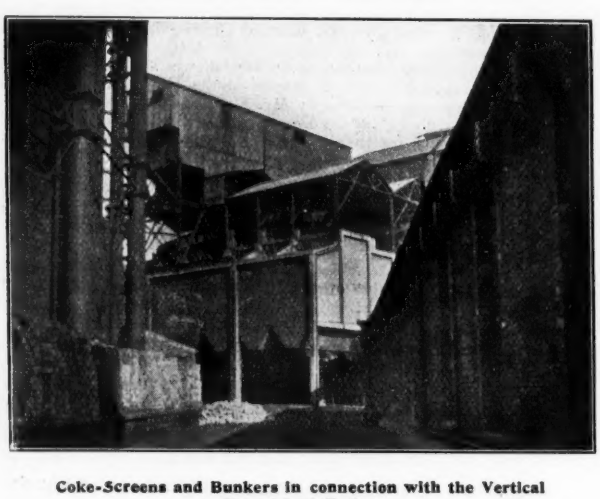
		C.Ft.
Neepsend	5 gasholders total capacity	13,930,000
Grimesthorpe	2 " " "	3,600,000
Effingham Street	3 " " "	3,330,000
Arundel Street	1 " " "	640,000
	Total	21,500,000

The distribution department is sub-divided into mains and services, fittings, meters and workshops, and showrooms.

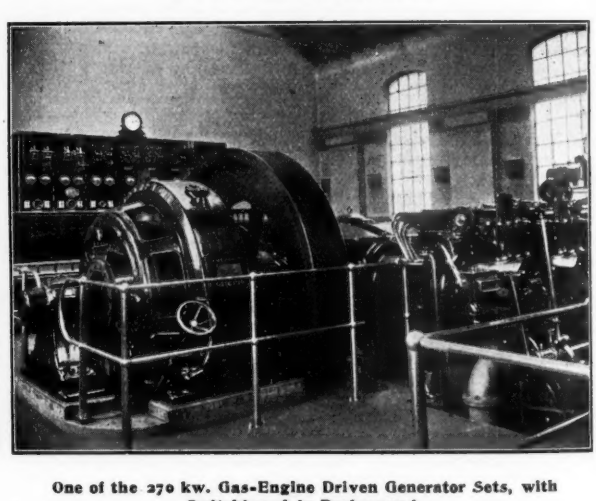
The mains department is responsible for the whole of the distributory system, the area of which is 146 square miles. This system comprises over 700 miles of mains varying in size from 3 in. to 48 in., and includes 14 miles of high-pressure steel mains fed by two sets of Waller's horizontal double-acting duplex compressors, each direct-coupled to a 90 H.P. "National" gas engine, and having a capacity of 100,000 c.ft. per hour against a pressure of 10 lbs. per sq. in. This main delivers into the low-pressure system through Reynolds' governors at suitable points throughout the district. The gas can be supplied from any of the three works, which are connected by a 30 in. driving main in such a manner that each can supply the others or the district. The pressure is controlled by means of the works governors, further assisted by six district governors, as there is a difference of 800 ft. in altitude between the lowest and highest points. This department is also responsible for the re-instatement of all streets where main or service work has been carried out.

Railway Sidings and Wagon Tippler.

No. 3 Horizontal Retort-House.



Coke-Screens and Bunkers in connection with the Vertical Retort Installation.



One of the 270 kw. Gas-Engine Driven Generator Sets, with Switchboard in Background.

THE NEEPSEND WORKS.

The Neepsend Works are the largest of the Company's three manufacturing stations, and are situated on the north-west side of the city.

The works cover an area of 18½ acres of ground, and their total productive capacity is:

	C.Ft. per Diem.
Horizontal retorts No. 2 house	4,000,000
" " No. 3 "	4,000,000
Vertical retorts	4,000,000
Water gas plant (carburetted)	1,500,000
" " (blue)	1,000,000
	14,500,000

Sidings.

The raw material for gas manufacture is received from the L.N.E. Railway Company's main Sheffield-Manchester line by railway wagon on sidings which are 41 ft. above the main yard level. The various retort houses are placed parallel to the sidings and close-up to the embankment, which is utilized as a series of shoots for coal storage. Coal is thus fed direct by gravity to the breakers and elevators. The wagons are discharged by hand for the horizontal retorts; but in the case of the vertical retorts, an electrically operated wagon tippler has been installed. This has a capacity of 100 tons per hour, and is worked by two men, who empty the coal and attend to the necessary shunting. The wagons are shunted by means of a wire rope and a steam-driven winding engine. Coke is filled into wagons on these sidings; and for this purpose the gravity bucket conveyor, which takes coke from the vertical retorts to the storage bunkers, is also arranged to take coke from the storage bunkers and, by an extension, to deposit it into the wagons. There is storage capacity at these works for 36,000 tons of coal.

Retort Plant.

No. 1 retort house contained hand-fired retorts, and was pulled down in 1910.

No. 2 retort house, originally erected in 1865, is 378 ft. long by 90 ft. wide, and contains 272 retorts in three ranges. Nos. 1 and 2 ranges consist each of twelve beds of eight retorts in vertical tiers of four, 20 ft. long and 22 in. by 16 in. in cross section, having a combined capacity of 3 million c.ft. per diem. No. 3 range consists of ten beds of eight retorts, 20 ft. long and 21 in. by 15 in. in cross section, having a capacity of 1 million c.ft. per diem. All these beds have regenerator furnaces fitted with step grates. The retorts are charged and discharged by West's compressed-air machines, which have been converted to the De Brouwer type of charger and pusher. The coke is removed by a Dempster electrically driven monorail telpher. Each range is provided with two 12-in. retort house governors and tar towers.

No. 3 retort house was entirely re-modelled in 1910-11, and is 305 ft. long by 105 ft. wide. It contains 240 retorts in two ranges, each range consisting of twelve beds of ten rounded D section retorts in vertical tiers of five, having a total capacity of 4 million c.ft. per diem with twelve-hour charges of 14 cwt.

Each retort is 22 ft. long and 24 in. by 16 in. in cross-section, built in 85 p.ct. silica bricks in the arch, and fireclay tiles in the floor. The combustion chamber is built in 95 p.ct. silica. The regenerators are of the Klönne type; and there is one deep furnace fitted with step grates on the discharging side of each bed. Each range has two 15-in. retort house governors. The stoking machinery is Arrol-Foulis charging and Hunter-Barnett discharging machines, worked by hydraulic power. The coke is quenched by water sprayed upon it through hose pipes while the skips are in front of the retorts, and is afterwards removed by a Dempster electrically driven monorail telpher. The hydraulic power is generated by an Arrol-Foulis pumping engine, which maintains a water pressure of 650 lbs. per sq. in., and is situated in an engine house at the end of the retort house. This engine house also contains two West's steam-driven air compressors to supply the power for the stoking machines in No. 2 retort house.

The Vertical House.

The vertical retort house contains 48 Woodall-Duckham 7 ton retorts in two benches having a capacity of 4 million c.ft. per diem. Each retort is 25 ft. long, 5 ft. by 7 in. at the top, and 6 ft. 6 in. by 1 ft. 6 in. at the bottom, and is independently controlled as a separate unit in the heating. The furnaces are twelve in number, of the step-grate type, and situated three at each end of each bench. The coal for the retorts is passed through a 70 tons per hour breaker, and elevated by an 80 tons per hour gravity bucket conveyor to the bunkers above the benches, which hold about 44 hours' supply. Fuel for the furnaces is brought from the coke storage bunkers by means of a 24-in. reversible band conveyor, and fed into the foregoing gravity bucket conveyor, which is thus able to elevate both coal and coke simultaneously. The retorts are rodded and charged with coal hourly, while the extractor chambers are emptied of coke every two hours. The gas is taken away from each retort by an 8-in. off-take pipe, and is controlled at the outlet of each bench by two 12-in. Parkinson & Cowan retort house governors. Steam is admitted into the retorts through fireclay tubes and nozzles; the pressure being governed by a Cockburn reducing valve, and each individual supply further controlled by a $\frac{3}{16}$-in. nipple.

The discharging mechanism is of the usual rotary toothed-wheel type driven by 5 H.P. "National" gas engines in duplicate. The retort bottom doors are of the semi-rotary water-sealed type, and the coke is discharged into four 2-ton electrically driven trucks, made by Herbert Morris, Ltd. These convey the coke to two hoppers, situated at the ends of the benches, which feed into a 40 tons an hour gravity bucket conveyor. This conveyor is one of the longest of its type, being 746 ft. long, and containing 320 buckets. It serves the dual purpose of taking coke from the retorts to the screening plant, and also from the storage bunkers to the siding for loading into railway wagons. The coke storage bunkers have a total capacity of 700 tons.

Each bench is provided with a Ruston-Hornsby waste-heat boiler of the fire-tube type, capable of generating 6000 lbs. of steam an hour, together with a Thompson superheater for the utilization of the surplus heat in the waste gases. The draught is induced and controlled by a Davidson "Sirocco" fan driven by a 25 H.P. totally enclosed variable-speed electric motor. Each boiler is 16 ft. long by 6 ft. 9 in. diameter, contains 248 tubes, and will generate steam up to 120 lbs. per sq. in. pressure. One boiler is capable of supplying all the steam required for this plant, and the other boiler is therefore available for augmenting the general works steam supply. Two Weir pumps are used for the feed water, and are controlled by Trist "Thermofeed" regulators and governors.

Each bench is provided with a chimney 120 ft. high, lined throughout with 4½ in. firebrick work.

Water Gas Installation.

The water gas plant consists of one Humphreys and Glasgow carburettor set of a capacity of 1½ million c.ft. per diem, and one Davison & Partner blue plant of a capacity of 1 million c.ft. The blowers are Keith-Blackman fans in duplicate, and the exhausters, also in duplicate, are Waller's four-blade type of a capacity of 80,000 c.ft. per hour. The oil storage tank is built into the railway embankment, and is of reinforced concrete. It has a capacity of 38,000 gallons, and feeds the oil to the pumps by gravity. The coke for the generators is raised to bunkers above them by means of a bucket elevator. The meter for measuring the water gas is a Thorp rotary, having a capacity of 120,000 c.ft. per hour.

Other Plant.

Electric Power Plant.—The whole of the 220 volts direct current used on the works is generated by sets in duplicate of Crompton's 270 KW. generators direct coupled to "Premier" 400 H.P. four-cylinder horizontal gas engines. These engines are the largest in Britain working on town gas. The water supply for cooling the gas engine cylinders is taken from, and returned to, a neighbouring gasholder tank. The gas engines are started by means of air compressed to 180 lbs. per sq. in. provided by a 5 H.P. Crossley combined gas engine and air compressor.

Foul Mains and Condensers.—The 24 in. diameter foul mains for all houses are very long, and so arranged that the length of travel of the gas can be considerably varied as required. There are four batteries of atmospheric condensers and two Newton Chambers water-cooled condensers, each having a capacity of 1 million c.ft. of gas a day.

Exhausters.—These are contained in one house, and are four in number, all four-blade steam driven. Two are Gwynne single type of 250,000 c.ft. per hour each, and two Waller twin type of 220,000 c.ft. an hour each.

Tar Extractors.—These consist of two 5 million Livesey washers, and one 3 million "P. & A." tar extractor.

Ammonia Washers.—There are two Clapham washer-scrubbers each of 4 million c.ft. a day capacity, one 5 million c.ft. Holmes brush washer-scrubber, and one 5 million c.ft. Kirkham-Hulett vertical centrifugal washer.

Purifiers.—There are six sets of oxide purifiers, four boxes to each set; three sets being in one house and the other three sets in separate houses. All sets have oxide floors above them to which the oxide is raised by means of bucket elevators.

Naphthalene Washers.—After purification, the gas is treated for naphthalene extraction in two 5 million c.ft. Holmes rotary brush washers, using gas oil as the washing medium. The naphthalene at the inlet averages 3½ grains per 100 c.ft., and is reduced to under 1 grain at the outlet.

Streaming of the Gas.—The works are laid out so that the gas from each of two retort houses can be treated separately throughout from the retorts to the holder inlets.

ANALYSIS OF COAL WITH PHENOL AS A SOLVENT.

In Bulletin No. 76 of the University of Illinois Engineering Experiment Station, S. W. Parr and H. F. Hadley give the results of their researches into the analysis of coal. They state that the results obtained from ordinary methods of coal analysis are of rather narrow application, and that the data from either the ultimate or the proximate methods convey little information which can be applied to the everyday problems connected with the handling and use of coal, such as coking, storage, deterioration, oxidation, weathering, &c. The ordinary methods of analysis give the percentage amounts of certain elements or compounds which result from destructive processes, and do not even remotely take account of the actual constituents of the organic or active portions of the coal as they occur in unaltered form. It is these unaltered constituents which have to do with coking properties, smoke formation, type of distillation products, and spontaneous combustion.

Summary of Results and Conclusions.

1. Phenol at 100° C. extracts a substance which is the vital constituent concerned in the coking of coal. It has a definite melting-point, and a decomposition temperature above that of the melting-point.
2. Extract and residue are capable of absorbing oxygen. The effect upon the extract is to reduce its coking properties. The oxygen taken up is chemically combined. The insoluble portion has the greater avidity for oxygen.
3. Different coals vary widely in the amount of material dissolved by phenol. High volatile coals gave 35 to 40 p.ct. of soluble material. Low volatile coals gave 20 to 30 p.ct.
4. Residue and extract show an avidity for water; the former more so than the latter.
5. The extract contains more volatile matter than the residue.
6. The ultimate analysis of the coal, residue, and extract shows that the percentage composition of carbon, hydrogen, nitrogen, and oxygen is substantially the same.
7. Destructive distillation of the residue and extract gives gases of practically the same composition.
8. Oxidation of coal, residue, or extract produces a lowering in the percentage of volatile matter. It decreases the amount of material which may be extracted by phenol, and the coking properties are decreased in proportion to the extent of the oxidation. It is shown by an increase in the percentage of carbon dioxide in the gases produced by thermal decomposition.

The Consolidated Gas, Electric Light, and Power Company of Baltimore.—The annual report of this Company shows an increase in the sales of gas—which now total 10,016 million c.ft.—of 2·67 p.ct., and an increase in the number of consumers of 2·70 p.ct. The industrial load, it is stated, continues to show large gains, being 21 p.ct. greater than in the preceding year. The gas generating capacity was increased by 7 million c.ft. per day; the total manufacturing capacity now being 67 millions per day. Accompanying the annual report is an illustrated description of the undertaking and its aims. Gas as an ideal fuel for industries finds utilization in a constantly expanding field in Baltimore. The importance of this development is manifest by the volume of gas used in 1924. The industrial and commercial business represented 25·2 p.ct. of the total gas sales; and the average amount used per domestic consumer was 49,993 c.ft.

FUNDAMENTALS OF HEATING AND VENTILATION.

Views of Mr. A. H. Barker, B.Sc., B.A., Whit.Sch.

At the Annual Meeting of the Heating and Ventilating Engineers, the evergreen problem of the relation between theory and practice was the basis of a good deal of the discussion which followed the reading of a paper on the "Unknown Factors in Heating and Ventilation" by Mr. A. H. Barker, of University College. Mr. Barker always expresses his views forcibly. As he himself stated, if you intend to arrive in a carriage at the entrance of a building, it is necessary to drive the horses a little way past. Perhaps it was this emphasis which caused many of the speakers in the discussion to lose sight of the essential idea of Mr. Barker's paper, which is really that very little is known about the fundamentals of heating and ventilation, not because it is impossible to solve the problems, but because sufficient attention is not paid to the value of research work. It is only too true that, while much money is spent on improving imperfect processes, there is always immense difficulty in getting together the few pounds necessary for research work which aims to discover the primary imperfections of these processes; and when one regards the motive underlying Mr. Barker's paper, there can be no doubt that he has a very strong case. Too often theory is mocked at because the so-called practical men are vastly superior in numbers.

The Unexplored Field.

The unexplored field of heating may be divided into two parts. The first relates to the working properties of the materials and plant employed. The second, which is much more difficult, relates to the results produced by the plant. We require to know, said Mr. Barker, what results we may expect from different classes of boilers under different conditions. We have only a rough general knowledge of the resistance to the flow of fluids in the practical pipes commonly used, and little or none relating to various kinds of valves and fittings. The science and practice of heating and ventilation are not so far advanced that we can calculate on this subject with any certainty. In how many installations are there radiators which are only lukewarm, or, at any rate, much colder or hotter than their fellows? In many cases, provided the user is reasonably comfortable, he does not mind whether isolated radiators are not fully up to the designed temperature, and does not know he is paying five times too much for fuel as he ought to be paying. Let us imagine that we have plans of a large theatre warmed by radiators of known size fixed at certain well-defined points on the plan, each being kept at a known temperature. In addition there is introduced a certain quantity of air through gratings, the positions of which are exactly known, and definite quantities of air are removed through extract gratings. What will be the effect on air movement and temperature in the neighbourhood of a person sitting at a particular point in the auditorium? Until a problem like this can be accurately solved, we cannot say that we understand the practical problems of heating and ventilation.

Temperature and Effect.

Every observant person, who has at any time sat in a room and kept careful watch on the thermometer and noted his own feelings at the same time, knows that there is a great deal to be explained in the variations of the feeling of warmth and of freshness in a room. In one room it is possible for a person to sit in perfect comfort when the thermometer reading is 52° or 53° or below. When it is 60° any ordinary person would agree that it was too stuffy. In another room the temperature is 63°, and this is none too high for comfort. There is no stuffiness. There is obvious need of some definite explanation of this difference. This problem is at the very foundation of the whole science of heating. Up to the present it has practically not been attacked at all, except very tentatively by a very few scientists. When it is solved it will radically transform all notions and practice in heating and ventilation. In general terms, the essence of the problem is to determine the physical effect of different heating appliances on the thermal condition of a room, and of the latter in turn on the comfort of a human being in it.

The problem has three branches:

1. How to determine how much of the total heat delivered into a room, from any given source, or already existing in a room, is radiant, and how much convected, and how to define its quality and distribution in each case. Conversely, how to introduce into a room a given quantity and quality of convected and radiant heat with a specified distribution when we know how much of each we want.

2. How to measure the effect, both immediate and ultimate, in the room itself, of different quantities, qualities, and distributions of radiant and convected heat transmitted to the room in different ways and in different proportions, with different orientations and at different temperatures.

3. How to correlate the room condition as determined in section 2 with the effect on the feelings of a human being.

A Fundamental Fallacy.

It has become firmly fixed in our minds that:

1. The heat losses from a room when the thermometer reading is about 60° are determined by the transmission through the walls and the heat carried away by the air interchange.
2. This loss can only be balanced by the delivery into the room of an equal quantity of heat from a radiator or otherwise.
3. A thermometer reading of 60° is necessary for our comfort.

Therefore, it seems logical to conclude that the proper and only way to heat a room is to supply the calculated requirements in radiation, and to have a few pipes to supply it with hot water. This fundamental fallacy—for it is nothing less—is based on the subtle mistake in the third premise, which is nothing more than a theory, and an incorrect one at that. Its fallacy is in the assumption that there is a close connection between the reading of a thermometer and the thermal condition of a room on the one hand and our comfort on the other. The fallacy arises from the fact that experience shows that in any particular room heated by one particular means which is in operation for a long time, the higher the thermometer rises the warmer we feel; and that generally in a room constructed of ordinary building material, when 60° or thereabouts has been maintained for a sufficient length of time the thermal conditions in the room become comfortable. The mistake, in logic, is to assume that this is the one and only way in which comfortable conditions can be produced. It is easy to prove that it is not the only way.

Suppose we have two radiators, regarding which we can prove with certainty that one gives off 20 p.ct. more heat than the other, and suppose we put these radiators, one at a time, into a room built entirely inside another. The space between the two walls is supplied with refrigerating apparatus, so that a constant low temperature can be maintained exactly. We try the effect of each radiator. At first sight one would say that the respective effects would differ by the same proportion as the total emission—that is to say, that one effect would be 20 p.ct. greater than the other. Yet records show that the actual effect as measured by a thermometer by no means corresponds to the total emission. This means that we do not know how to measure the thermal condition of a room interior.

The Human Nature Factor

Until equality exists among human beings, suggested one speaker in the discussion, it will be impossible to define a set of comfort conditions which will be generally applicable. Those conditions which suit one person are often intolerable to another. Of course, no one can question the differences which exist between the heat requirements of different individuals; but, as Dr. Margaret Fishenden pointed out, much can be done by co-operation between physiologists, physicists, heating and ventilating engineers, and architects. It would not be difficult for physiologists to determine what conditions were conducive to heat comfort. A desirable skin temperature could be found, as also could the effect of clothing. The emissivity of the skin could also be determined. Then it should not be a difficult matter, said Dr. Fishenden, to construct an instrument fulfilling the human conditions, and by its aid find out the amount of heat required in different circumstances, and the proportions of radiant and convected heat. With existing data it was impossible to make accurate calculations, and much research work was needed. The heat capacity of walls and fabrics, for example, was enormous in comparison to the steady heat flow necessary to maintain a room at a given temperature.

The Smoke Evil.

In the course of his presidential address, Mr. Alcwyn A. Jones stressed the need for fuel conservation and the elimination of smoke. There is no question, he said, that the use of the wasteful open fire and kitchen range is gradually being replaced by more economical methods of heating. When it is realized that 2½ million tons of soot emanate annually from fog-creating fireplaces, it must occur to the heating engineer that he has a mission to perform. Soot produced by domestic fireplaces is an immensely expensive product when considered in relation to the material damage done by it. Take the waste of the fuel itself, which for house cooking and heating Mr. Barker has estimated to be at least three-quarters of the fuel used. Then consider the extra washing and wear and tear of linen, damage and renewal of textile fabrics in our homes, damage to buildings, cost of extra cleaning and painting, injury to vegetable life, extra expense due to fogs, and, not by any means least, the increased mortality, impairment of health, and reduced personal efficiency which must cost the community many millions per annum. Smoke abatement is continually being referred to in the Press and elsewhere, but heating engineers should take a larger share in the publicity and cure of this great public nuisance. There are many panaceas for the evil; but it might be further impressed on the public that central heating and hot-water supplies utilizing smokeless fuel, such as coke, would save enormous sums for raw coal, which are at present borne by the community. The education and enlightenment of the public is better than legislation.

"B.C.G.A." MIDLANDS DISTRICT CONFERENCE.

A SUCCESSFUL GATHERING IN LEICESTER.

LAST Thursday the City of Leicester was selected, for the second time, for the holding of a District Conference of the British Commercial Gas Association; and if the first one was successful (and those who recall it are unanimous on the point), the second was assuredly not less so. There was manifested throughout the proceedings a live interest which amply proved the usefulness of these gatherings. When at the November meeting of the Midland Association of Gas Engineers and Managers the suggestion was made to hold the conference in Leicester, Mr. Hubert Pooley (the Gas Engineer and Manager) promised a cordial welcome—a promise which was more than fulfilled.

The conference was held in the spacious County Rooms, in Hotel Street, under the presidency of Councillor GEORGE E. HILTON, J.P. (the Chairman of the City of Leicester Gas Department), who, at the outset, expressed the regret of the Mayor (Councillor Herbert Simpson, J.P.) at his inability to be present, through having been called away to Paris.

A WELCOME.

The DEPUTY-MAYOR (Councillor J. Mantle Hubbard, J.P.), in extending a hearty welcome to the visitors, remarked that in Leicester the gas undertaking was under the control of the Corporation, and was one of their great trading departments. In it the city had sunk something like 1½ millions of money. The importance would therefore be appreciated of its being carried on with the greatest efficiency. As to its great service to the community, there could be no question. The Chairmanship of the Gas Committee was not quite the "bed of roses" it used to be; for in former days there was not the competition that now existed. The British Commercial Gas Association, he understood, was largely a propagandist body, and he judged it to be successfully so from the able and clever advertisements that appeared in the papers. An important part of the work was the education of the public in the use of gas in the best possible manner, and therefore he wished the Association every success. In Leicester there were 60,000 gas cooking stoves in use, and well over 12,000 gas fires, together with a very large number of gas engines. He hoped the visitors had noticed that the atmosphere of the city was not like that of some of the northern industrial towns. Leicester was noted for its cleanliness and the relative purity of its air. This was because so many of the factories were run by gas power, rather than through the agency of coal-fired steam boilers. The greatest attention was paid to the health of the citizens, and anything which would assist in this direction might be assured of hearty support. The Chairman of the Gas Committee had done a great deal of good work for the city.

THE CHAIRMAN OF THE GAS COMMITTEE.

Councillor HILTON said that, as a Vice-President of the British Commercial Gas Association, and as Chairman of the Leicester Gas Committee, it was a very great pleasure to him to be able to preside over this conference, and to endorse heartily the welcome to the city which the Deputy-Mayor had extended to them. He (Councillor Hilton) had been Chairman of the Gas Committee for rather more than ten years. He was also Vice-Chairman for two years during the late Mr. Alfred Colson's time. Mr. Colson was an Engineer who was remembered with pride by everyone in the gas profession. Since then they had had Mr. Pooley; and they felt that they were being most excellently served by one of the best Engineers in the country. This fact alone had rendered his own task as Chairman of the Committee a comparatively light one. The Association meeting there that day gave them an opportunity to reflect how much Leicester, like other Midland gas undertakings, was indebted to the work of such a "live" body, and how indispensable it was to all of them. The "B.C.G.A.," above all, built-up a sound public opinion in favour of gas throughout the country; it kept in close touch with the national Press; and, apart from occasional lapses in that connection, it obtained for the industry fair treatment. It conducted and subsidized research, in order that the Press and the public might learn from it nothing but the truth; and it provided the materials at wholesale cost for the retail work of local publicity—whether that took the form of advertising or of literature, technical and popular, industrial and domestic. The gas industry was passing through a very trying time just now, especially with regard to residual products. In Leicester and in the Midland Counties there never had been a time when competition was so severe as it was to-day; but it was encouraging to note that, in spite of this keener competition, sales of gas throughout the country had shown enormous increases. In Leicester the increase in the sale of gas for the past year—155 million c.ft.—constituted a record for the department, necessitating the lay-out of additional works to meet future increased demands. Apart from the competition to which he had referred, the gas industry had to combat ignorance and prejudice; and the "B.C.G.A." was doing invaluable propaganda work, advocating and popularizing the uses of gas. People, gaining a clearer understanding of its value, were beginning to realize that gas was one of the necessities of present-day life. That the Leicester gas undertaking was progressive, was borne out by the fact that full use had been made of the means by which companies and municipalities were able to increase their gas sales. They had between 900 and 1000 gas-engines now at work; while out of nearly 68,000 consumers for all purposes, as had already been mentioned, 60,000 had gas cookers, and during the past ten or twelve years 12,000 gas fires had been fixed in connection with the hire-purchase and simple hire schemes adopted by the Committee. For lighting, gas could still beat electricity in many ways, and the results obtained in the city for outside illumination with lamps fitted with superheated cluster burners had far exceeded the department's most optimistic anticipations. For cooking gas had no serious rival; and the popularity of the modern gas fire had so increased that it was felt they had only just touched the fringe of an immense field of gas utility. The "B.C.G.A." was a pool of information and experience. In this capacity it needed the help of individual undertakings. They must all put something into the pool, or there would be little to take out of it. This conference was an excellent example of the value of its work.

MR. GOODENOUGH'S ADDRESS.

Mr. F. W. GOODENOUGH (Executive Chairman), on rising to address the conference upon the work and policy of the Association, remarked that it was a great pleasure to associate himself with what had been said about Mr. Pooley, who was not only one of the foremost gas engineers of the day, but also one of the foremost gas administrators and the very best of good fellows. [Applause.] The gas industry owed a great deal to the progressive policy that had been pursued in Leicester for many years. Leicester, with Birmingham and other concerns in the Midlands, had always been in the front rank of undertakings supporting every national movement on behalf of the gas industry.

Proceeding to the subject of his address, he said that the main work of the "B.C.G.A." is to ascertain all the facts about all the ways in which gas can best serve the community to its advantage, and then to make known those facts both to the industry and the community it exists to serve. The ways in which gas can best serve the community include not only the invention, construction, manufacture, and installation of the most economical gasfittings and appliances, but the instruction of the public in their economical operation and the continuous maintenance of them in efficient working order. That may be summed-up in the phrase "Supply *plus* Service," with the accent on the "Service." The work of the "B.C.G.A." is to advertise and advocate gas service of the highest possible standard. If one were to judge by what one reads sometimes in the newspapers about the supposed conditions in some places, the conclusion would be that the days of the gas industry were numbered. But to those who write stunt paragraphs with display headlines for the purpose of making political capital out of industrial problems that should be entirely outside the dusty arena of party controversies, he would say a friendly word. The new of to-day is not necessarily the enemy of the new of yesterday, which, indeed, may also be the new of to-morrow. Public utility services may be, often are, mutually complementary, not mutually exclusive; and before you start depreciating the achievements of one service in order to heighten the colours in which you are painting the performances and promises of another, be sure that you are not damaging unnecessarily and unjustly a local industry of great value to your city, alike as an employer of labour and as a servant of the citizens. In other words, make sure of your facts.

And what are the facts about the present and potential services of gas to the community? Well, gas began its service to civilization as an illuminant. Are the days of that service ended? By no means. Wherever the housewife has to count her pence before she spends them, and knows the importance of getting full value for every one of them, she will use gas for lighting, if she knows the facts about gas service. And wherever a factory or place of business or a street lighting authority wants the most light it can get for the lowest cost, it will employ gas for lighting. The "B.C.G.A." is by no means an anti-electricity organization. We should much prefer to get on with our business of advocating and advertising the services of gas, and leave our friends the electricians to get on with their business. We recognize, and freely admit, that there is a great and growing field of usefulness for electricity in the service of the community, and have nothing to say

against the development of that field to the full. But we also know that there is a great and ever-growing field of usefulness for gas in the nation's service; and, while our primary business is to point out the extent of that field, we are compelled, when the serviceability and advantages of gas are unwarrantably depreciated or ignored, to state the facts and to make clear the limitations of its competitors.

And at the present time it is absolutely necessary, in the interests not merely of the gas industry, which is of minor importance, but of the nation as a whole, to emphasize the fact that there are limitations to the possibilities of electricity in this country; to explain what they are, and why they exist. Almost all politicians have been, and are, talking just now as if electricity were a panacea for most of our industrial and social ills; and many of them are contemplating subsidies from the national exchequer for its development which are quite unwarranted and indefensible. Every industry should stand on its own bottom; certainly one that has been in existence for forty years. It is therefore necessary to remind our politicians of the facts, and to warn them of the consequences of ill-considered action. The electrical whole-hoggers among our politicians have been dazzled by visions, and bemused by the mystery of the invisible power which performs so many marvels. They do not know—how should they know?—the "A.B.C." of generating station economics.

The probabilities are all against the price of current for cooking and heating going relatively lower in the future. Stations that secure any considerable load on the uneconomic tariffs offered in some districts will soon find they have taken on a very unprofitable and troublesome business, and will only need a few dark as well as cold days to teach them an unpleasant lesson. Regarded, moreover, from the standpoint of the conservation of our coal resources, what possible defence can there be for urging the adoption of a system of cooking and heating that destroys 3 tons of coal to do the same work for the consumer that gas can do for the destruction of only 1 ton—and that destroys the chemical bye-products the gas-works recovers? Edison was right—Stanley Jevons was right before him—in warning the over-zealous, under-informed advocates of "Electricity for Everything" that its utility, while great, has its limitations; and the nation will be saved from loss and trouble if that fact is faced to-day, and the limitations are studied, realized, and observed. Let electricity and gas develop unrestricted, but also unsubsidized; with all reasonable facilities provided, but with no spoon-feeding; each in the sphere for which it can demonstrate its utility and economy. Then the nation will profit in the future, as it has in the past, from their rightful and healthy competition where their respective fields approach and even overlap each other. But let there be no favouring of the one at the cost and to the detriment of the other.

It is to gas and coke that the country can look for its salvation from smoke, and mainly to them. Electricity for power—for mechanical power, for the term "power" has been used much too loosely by political writers and speakers—is, together with the gas engine, doing much to diminish the factory chimney nuisance; but as a fuel it has no future, except for incidental use here and there. It cannot touch the great domestic heating problem. And in the low-temperature carbonization process there is no hope. Gas is the solution of the problem that appeals to the housewife, with coke where cheap solid fuel is really necessary. Apart from the question of the effect upon health and our national wealth, there is the effect upon the conditions of labour, both in the home and in industry, which gas is able to bring about. We have already largely abolished the worst and dirtiest drudgery in the home, and we have very largely altered the conditions of labour in the factories. The gas industry can honestly say that it has contributed to the health and well-being of workers by helping employers to provide ideal conditions for their employees. We need to be continually informing the public of what gas means to labour and the working people of this country, not only in our homes, but in the places in which they work. We of the gas industry are, in truth, able to feel that, in the work of the Association and in our daily work in our undertakings, we are serving our fellow-creatures well and truly, and not merely making money out of them.

Discussion.

Mr. J. H. Ellis (President of the Association), in opening the discussion, remarked that they were all greatly indebted to Mr. Goodenough for his well thought-out and excellent address. The lesson he had been endeavouring to push home was really one their mothers taught them in infancy—the simple maxim, "Waste not, want not." They did not want to waste anything, and least of all their great national asset coal; and unless they could prove that gas manufacture employed coal in the most economical manner, they could not, and they ought not to, succeed. What a great opportunity a large municipality like Leicester had of setting an example, not only to its citizens, but to the country at large, by showing in what ways the two great commodities of which it had control could best be applied. The two undertakings, being controlled by one and the same body, ought not to be put into useless competition. Nobody would dream of contending that trams could be driven as cheaply and as efficiently by gas as by electricity; and nobody would contend—if he knew the facts—that it was possible to cook as well by electricity as by gas. The wise thing for a municipality to do would be to get their gas and electrical engineers together and endeavour to arrange lines on which both undertakings should proceed in order that the community might enjoy the maximum advantage. Personally, he was an optimist with regard to the gas industry; and he welcomed fair competition. They were indebted to Mr. Goodenough for his efforts to make Wembley the success it ought to be this year.

Mr. J. Ferguson Bell (President of the Institution of Gas Engineers) realized the important work being done by the "B.C.G.A.," and expressed the opinion that the success of this work was due to the fact that any statement put forward by the Association could be absolutely relied upon. He, also, was very optimistic with regard to the industry, because gas was being used in increasing quantities by an increasing number of people. The increase in gas consumption throughout the country was truly amazing. He hoped the municipalities of the country would seriously take in hand the air pollution question; greater attention must be given to the scientific use of coal. It was true that the value of residuals had declined; but this was not really to their disadvantage, because he believed that prices had to come down in all directions. To maintain the trade of the country, goods must be sold at a price that people were willing to pay.

Mr. A. W. Smith (Birmingham) apologized for the absence of Alderman J. H. Lloyd (the Chairman of the Gas Committee), who had hoped to be present. Alderman Lloyd had pleasant recollections of Leicester and of Mr. Pooley, for whom he had a great admiration. He (the speaker) was not in the least afraid of competition. Electricity had a field of its own; and there was no need to worry about competition so long as it was fair and straight. With an increased output of gas in Birmingham of about 1000 million c.ft. this year over last year, he saw no reason to be anxious about the future of the gas industry. He had been most impressed by Mr. Goodenough's address. The great work of the Association was in education and inspiration. The Salesmen's Circles were doing wonderfully good work. It had been astonishing to see the enthusiasm of the salesmen, and this alone fully justified the activities of the "B.C.G.A."

Mr. Hubert Pooley also thought that Mr. Goodenough's address had been full of encouragement to them. In connection with their own work and that of their chief opponent, he quite agreed that there was plenty of room for both, and that each could perform useful service to the community.

Mr. W. M. Mason (Manager of the Association) pointed out that the policy of the Association was not to enter into controversy.

Luncheon.

There was then an adjournment for luncheon in the Oriental Hall, at which a party of about 120 sat down under the chairmanship of Councillor Hilton, who proposed the Loyal Toast. "The British Commercial Gas Association" was submitted by Mr. J. Ferguson Bell, who said the popularity of gas owed much to nearly fourteen years of work by the Association. The "B.C.G.A." had done magnificently by educating the public to the facts. Any statement emanating from the Association could be fully justified; and this was very important. In 1924 the sale of gas in Leicester was 2775 million c.ft. In the last fifteen years the growth of the undertaking had been equal to some 740 million c.ft., and during 1924 the increased sale of gas was greater in volume than ever before in the history of the undertaking. The city rates had been relieved by the undertaking to the extent of £905,000. The Leicester Corporation were greatly indebted to two things—first, to the fact that they had under the direction of their Engineer and Manager an admirable and loyal staff; and, secondly, to the fact that they had at all times availed themselves of the services of the Association. He referred in eulogistic terms to Mr. Pooley's work, and concluded by remarking upon the good fortune of the Association in having persuaded Mr. Ellis to occupy the position of President. Mr. J. H. Ellis, in responding, said it was an honour to be President of the British Commercial Gas Association, because the principles upon which it acted were honesty and efficiency in the public service. The Association, standing for these things, also stood for justice. Alderman Sir Albert Ball, J.P. (the Chairman of the City of Nottingham Gas Department), proposed "The City of Leicester," and expressed the opinion that cities like Leicester and Nottingham, and all great trading centres, could trace their rapid rise to the introduction of gas, which had played a most important part in the progress of civilization. Leicester had an excellent Gas Committee Chairman, and an Engineer who was second to none in the country. He wished also to pay a tribute to Councillor Hubbard. The Deputy-Mayor replied, and submitted "Our Host, the Chairman of the Gas Committee." To Mr. F. W. Goodenough was entrusted the toast of "The Press."

Atmospheric Pollution.

The afternoon session—at which Councillor George E. Hilton again presided—was devoted to a consideration of the evil effects of atmospheric pollution and to its remedy.

Councillor Hilton, in opening the proceedings, said he was not going to anticipate what the medical experts would be saying later as to the nature and seriousness of the effects of coal smoke on health. But it did not need an expert to realize that the loss of sunshine due to smoke was very detrimental, or that the impurities inhaled in a smoke fog were probably injurious to the lungs. Dr. Owens (Superintendent of the Meteorological Office of the Air Ministry) had said that "it had been calculated that seven-eighths of the sun's power was shut-off by smoke from the centre of London, and five-eighths from Westminster." Many industrial towns of the Midlands and North must have an even worse record than that. Dr. Leonard Hill had told them that statistics were collected in Glasgow, where, in cold weather, white mists became smoke fogs, while in seven small

Scottish towns the mists were but little polluted. In Glasgow deaths from respiratory diseases rose during cold, foggy weather from 35 to 233; and in the small towns from 31 to 93. He did not want to say any more than this about the effects of smoke. The cure was to use smokeless fuel; and it was being gradually put into effect all the time, because the intrinsic superiority of gas for most purposes, and coke as a solid fuel for others, commended them to the consumer in preference to coal. But progress was nevertheless too slow for several reasons. Manufacturers were sometimes deterred from replacing coal by gas, because they found that in fuel costs alone gas was the more expensive. Here what was chiefly needed was the spread of knowledge—knowledge of the fact that gas had so many incidental financial advantages that it actually meant increased and improved output at a cost lower than with coal, when all the factors were considered. Domestic consumers of fuel were, on the other hand, deterred from using gas only by the fact that their houses were built for burning coal, and they were too conservative to be bothered with a change. The pity of it was that even new houses were being put-up with provision for coal fires, though rarely in these days for coal-fired kitcheners. He would appeal very strongly to municipal authorities, and also to architects, to realize that both their responsibility and their interest was to provide houses which should be absolutely smokeless, but which should also be adequately ventilated. There was no doubt, however, that legislation to speed-up smoke abatement was urgently required, though they would have to wait until next session before they got it. At present the annual home consumption of coal was in the neighbourhood of 180 million tons, and of this considerably more than three-quarters was burned in its raw state. When talking of smoke abatement, therefore, there was no need to waste time in arguing the merits of gas and electricity. There was ample scope for both to make all the inroads they could upon the 75 p.ct. of the fuel consumption which consisted in burning raw coal.

Mr. R. Veitch Clark, M.A., M.B. (Medical Officer of Health to the City of Manchester), then dealt in a convincing manner with the subject of "Atmospheric Pollution in Relation to Health." He pointed out the interference that smoke in all forms offers to the proper distribution of light, and to the effect of sunlight on ourselves. The first thing that strikes one in connection with atmospheric pollution is the presence of soot, which consists chiefly of carbon, acids, and tars. Acids are strong solvents, and affect the cells of the human body, while much the same might be said of the tar products. Mist as such is not dangerous; it is what is put into it that makes it so. The valuable ultra-violet rays are easily interfered with by smoke.

Light, he went on to say, is essential to plants, and it is no less essential to human beings. We are dependent upon light for our actual existence. The remarkable curative effect of sunlight in the case of certain diseases is now generally recognized; and if it is good enough to cure disease, it is infinitely better for the purpose of preventing it. Why cannot we make sure that our atmosphere is clear? We cannot get rid of mist with our present knowledge; but we can get rid of the heavy fogs. Sunlight is not only important to us individually, but is also highly important in its relationship to the production of a good food supply for the nation.

The Remedy.

Mr. James Paterson, M.A., followed with a paper on "The Contribution of the Gas Industry towards Reducing Atmospheric Pollution." Fortunately, he said, there is a growing realization among thinking people that air pollution must be stopped; and he personally looks forward to the time when municipalities will vie with each other in air cleanliness.

The remedy must be a fuel which does not contaminate the atmosphere; and the gas industry steps forward with its two alternatives, a gaseous fuel and a solid fuel—gas and coke. The great work has already started. Many houses are now fully equipped with gas fires in the living rooms and bedrooms, a gas cooker in the kitchen, and a gas or coke-heated boiler for the supply of hot water. It is the domestic chimney, multiplied by hundreds of thousands and millions, which is the predominant factor in air pollution.

Interesting and convincing confirmation of this has been obtained in the City of Westminster. Continuous tests were made of the condition of the atmosphere throughout a whole day, whereby variations in the amount of solid matter in the air were found which are exactly parallel with the varying use of coal fires. The solid matter in the air is at a minimum during the night hours; but as the morning breaks, coal fires begin to be lighted, and the usual smoke that proceeds from a freshly-lighted fire begins to make itself obvious by a marked increase in sooty and tarry particles. This increase continues up to about 11 o'clock; and the solid matter then remains stationary in quantity, until the approach of mid-day brings about another increase. There is a decrease after 2 o'clock, with another small rise towards 5 o'clock; and the pollution of the air after 7 o'clock begins to diminish, until the night minimum is reached. But London is showing wonderful signs of improvement as regards air pollution. In five years no less than one million gas fires were installed in London houses, which means that probably somewhere about one million tons less coal were consumed. Last month Dr. Owens (Superintendent to the Advisory Committee on Atmospheric Pollution) said in a lecture: "Thanks to the gradual substitution of gas fires and other smokeless appliances for the antiquated coal fire, the soot deposit in London last year was only 59 p.ct. of that in 1916."

Thus we see that a sure and certain way lies open before us to attain our ideal of a pure smoke-free atmosphere. Great strides have been made in recent years in improving the efficiency of gas appliances. The gas cooker has been the subject of numerous improvements, while the gas fire has been fundamentally overhauled by scientific men and engineers. Its radiant efficiency has been vastly improved, and owing to proper construction the gas fire can no longer be saddled with the charge of "drying the air." From every 100 units of heat supplied to the modern gas fire, 50 are given out as radiant heat, 25 are thrown into the room as convected heat, while 25 pass up the chimney, and thus steadily assist the ventilation of the room. If the householder insists on having a fire which he can "poke," the gas industry can supply him with coke, which will burn perfectly if properly used in a grate of suitable size and shape. The bathroom can be supplied with hot water either from a geyser or a circulating system heated by gas or coke. There are many coke boilers now to be obtained which will yield a constant supply of hot water throughout the day and night; and in these the household refuse can be burnt, if care is used in feeding the boiler.

With none of these appliances can the air be polluted; and the gas industry has a great civic duty clearly set before it, to lead the people of these islands to the realization of the glorious vision of clean towns and cities, and a healthy population revelling in the enjoyment of a pure and unpolluted atmosphere.

Discussion.

The President, on behalf of those present, thanked the authors, and expressed hearty appreciation of what they had told them.

Mr. Charles J. Bond, C.M.G., F.R.C.S. (Leicester), remarked that it was quite impossible to travel through (say) Lancashire without observing the destruction of fuel that was going on. A point that had not been much touched upon that day was the psychological effect upon industrial centres of the shutting-out of sunlight. Anyone who had served on the Industrial Fatigue Board must have realized the important influence exercised by bright surroundings and sunlight on the mental health of the people. The injurious effect of smoke pollution upon the community being recognized, what was it that prevented them from "getting a move on," and "setting their house in order?" The first thing to do was to bring about a pressure of public opinion, in order that a beginning might be made in purifying the air of the towns in which they lived.

Mr. F. W. Goodenough said it did enormously improve the efficiency of any man's work, if he was able to do it under conditions of brightness, and not of gloom. The importance of light and brightness in the lives of children was equally marked. "We have," went on Mr. Goodenough, "Hospital Sundays, why not have also Sun Sundays, during which people could be told by men of Dr. Veitch Clark's knowledge and understanding, from the pulpits of the country, the crime that is being committed against the health and happiness of the community by this indifference to the smoke curse." The gas industry had in its hands the two great smokeless fuels on which the future health of the nation depended—gas and coke. The public must be told, and told again, how smoke could be prevented. Dr. Leonard Hill had just completed some research work to re-test his faith in gas heating, following upon an attack on gas fires by a medical officer of health, on the ground that rooms in which they were used were polluted with carbon monoxide. Dr. Hill said that with the most drastic tests he could apply to gas fires—doing everything short of closing-up the flue, in order to bring the products of combustion into the room—he had been unable to get the slightest trace of carbon monoxide. This was the result of the most stringent tests that science could suggest.

Councillor H. Carver, J.P. (the Deputy-Chairman of the Leicester Gas Committee) said he did not think he had ever heard addresses which more clearly proved their case than did those to which they had listened that afternoon.

The Vice-Chairman of the Leicester Health Committee thanked the speakers on behalf of his Committee, who, he said, were already giving considerable thought to this important question.

Dr. P. Stanley Blaker (Medical Officer of Health of Dudley) said it was right that they should try to clear the air, and it was also necessary that they should let the light into the narrow streets and the shut-in houses. He felt that the psychological effect of the ultra-violet rays had not been sufficiently emphasized at the meeting. It was necessary to educate the public; for if the public demanded a thing they would get it. This work was primarily the duty of the municipalities. Why not get on with the job?

The Chief Sanitary Inspector (Leicester) pointed out that in many cases house owners were not willing to do away with the existing kitchen range. A gas cooker with an independent boiler for hot water was an economical proposition.

Dr. Veitch Clark: If you are going to educate the public, educate them intelligently. Do not tell them facts only; tell them reasons.

Mr. Paterson: I would suggest that the Health Committee should find out how much dirt Leicester deposits month by month throughout the year. Then give the Gas Committee these figures, and let them work might and main to reduce the amount.

The Vice-Chairman of the Leicester Health Committee: We are already fixing-up apparatus in various parts of the town for this very purpose.

Mr. Ellis proposed a vote of thanks on behalf of the Association to the Leicester Gas Committee, its Chairman, Mr. Pooley, and the staff, for the admirable arrangements they had made for the conference. The best solution of the problem they had

been discussing lay in the co-operation of the various bodies whose duty it was to deal with these matters.

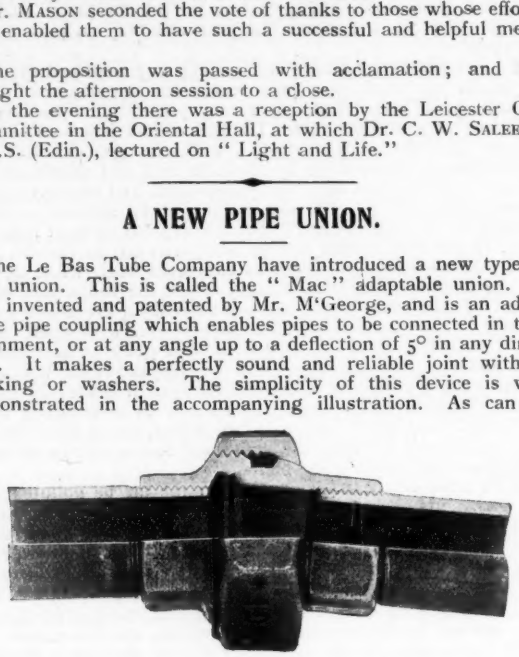
Mr. Mason seconded the vote of thanks to those whose efforts had enabled them to have such a successful and helpful meeting.

The proposition was passed with acclamation; and tea brought the afternoon session to a close.

In the evening there was a reception by the Leicester Gas Committee in the Oriental Hall, at which Dr. C. W. Saleeby, F.R.S. (Edin.), lectured on "Light and Life."

A NEW PIPE UNION.

The Le Bas Tube Company have introduced a new type of pipe union. This is called the "Mac" adaptable union. It was invented and patented by Mr. M'George, and is an adaptable pipe coupling which enables pipes to be connected in true alignment, or at any angle up to a deflection of 5° in any direction. It makes a perfectly sound and reliable joint without packing or washers. The simplicity of this device is well demonstrated in the accompanying illustration. As can be



seen, the joint itself is compound and spherical in type. The bearing surfaces are carefully ground. This union has been tested and found to be perfectly satisfactory for steam, water, gas, oil, petrol, or air pipe lines. Before being dispatched from the works, every fitting is tested to a hydraulic pressure of 300 lbs. per sq. in.

The metal used in the manufacture of this union is of the same quality as is employed for the "GF" malleable tube fittings; and the firm can supply either black or galvanized finish in all sizes up to 2 in. The union will prove specially useful when two pipes which are not in alignment have to be coupled-up; for, providing the deflection does not exceed 10°, all the fitter has to do is to slip one member over one pipe, the other over the opposite pipe, and to screw up the locking ring. This saves a good deal of the time and work now taken in putting a "set" in a pipe to bring it into alignment. The "Mac" union has been patented in all countries. Further particulars and lists can be obtained from the Le Bas Tube Company, Ltd., Dock House, Billiter Street, London, E.C.3.

Beautifying the Gas-Works.

Mr. John F. Weedon, of the People's Gas Light and Coke Company, Chicago, has something to say in the "American Gas Association Monthly" on the subject of "Beautifying the Gas-Works." It was, he thinks, natural, under the conditions which used to prevail, that the presence of a gas-works in the neighbourhood failed to fill the bosom of the citizen with civic pride. People absorbed the idea, and not without reason, that a gas-works in the neighbourhood was not a local asset. This attitude of the public towards the gas plant did not add anything to the sum total of general goodwill towards the industry; quite the reverse. When a company wanted to buy property for any purpose, the neighbourhood was frequently found to be up in arms. He cites the case of his own Company, who some years ago desired to erect shops, a distributing station, and a gasholder on some land that had been purchased, and were received with vigorous protests on the part of the villagers interested. However, the Company planned everything to give a pleasing effect. Ornamental iron fences were used, trees were planted, and grass plots, gravel walks, and flower beds were tastefully displayed. In fact, the property took-on some of the aspects of a public park, instead of becoming an eyesore and a nuisance. Mr. Weedon accompanies his article by a number of photographs showing what can be done in the way of beautifying gas-works, and particularly gasholder sites; and it is gratifying to note that this country is represented by a picture taken at Bournemouth.

Institution of Mechanical Engineers.—At an informal meeting of the Institution to be held on Friday, April 3, when there will be a discussion on "Modern Developments of Gas Production," Mr. Walter Dunn, M.I.Mech.E., Secretary of the Institution of Gas Engineers, will take the chair.

Manchester and District Junior Gas Association.—The twenty-fifth annual meeting of the Association is to be held on Saturday afternoon, April 4, in the Grand Hotel, Manchester, and will be followed by dinner at 5.30. At the meeting officers and members of Council for the ensuing year will be elected.

LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.

At a meeting of the Association held at the Westminster Technical Institute on Friday, March 20—Mr. W. Newton Booth presiding—two papers, one on condensers and the other on the drawing office, resulted in interesting discussions.

The Chairman remarked that the subject of condensation was deserving of their closest attention, and he was sure that Mr. White would have something interesting to tell them.

CONDENSERS.

By F. White, B.Sc., Assoc.M.Inst.C.E., of the South Metropolitan Gas Company.

Condensation as applied to gas-works routine is the cooling of the crude gas to approximately atmospheric temperature with the consequent elimination, or partial elimination, of certain vapours and impurities. Fundamentally, therefore, the condenser is a cooling device; unfortunately the problem of condensation does not end at this point.

Operations on the works are of a chemical or a physical nature, and temperature has a very great influence upon them. A great step towards standardizing working would have been made if it were possible to standardize temperatures. That they could be definitely fixed is, of course, impossible; but much can be done in the way of temperature control. Generally speaking, condensers are divided into two groups:

(*a*) Atmospheric.
(*b*) Water-cooled.

These may be used on either the pressure or the vacuum side of the exhauster; the latter being the more usual practice. The author does not propose to deal with the relative merits of condensing under pressure or under vacuum.

The question of atmospheric *versus* water cooling is again very debatable. Each system has its advantages and disadvantages. The main argument against water cooling is the alleged decrease in calorific value due to shock cooling, while the outstanding merits are:

(*a*) The small space occupied by the condensers.
(*b*) The degree of control.

With regard to the latter point it is interesting to note that, with a good water-cooled condenser, it is possible to bring the outlet temperature of the gas to within 2° Fahr. of the inlet temperature of the water. This means that, if comparatively clear water from river or canal is available, it is possible to maintain the temperature of the gas at the outlet of condensers at a reasonably low figure, even in hot summer weather. Where atmospheric condensers are used, it is sometimes the practice to obtain the final control by means of a small water-cooled condenser.

The conditions of heat interchange in a condenser are of interest. Usually the metal wall is in the form of a tube, as in fig. 1. If the thickness of the pipe be small, then:

$$\text{Heat transference} = \frac{K \times A\,(T_1 - T_2) \times \text{time}}{R_2 - R_1}$$

where T_1 = temperature of inside wall of pipe
T_2 = ,, ,, outside ,, ,, ,,
$R_2 - R_1$ = thickness of pipe
A = area of surface available

Unfortunately we do not know the temperature of the faces of the metal wall, but only the average temperatures of the water and the gas. With a typical gas condenser the heat transmission is of the order of 6 B.Th.U. per sq. ft. per hour per ° Fahr. difference in temperature (Haug), compared with a figure of the order of 500 B.Th.U. for surface steam condensers. The reason is that the temperature gradient is not simply through the metal plate, but there is a fall in temperature across both the gas and the water.

This is indicated in fig. 2, which is based on experimental figures by Jordan. This subject was dealt with in a paper by Mr. Newton Booth on "Heat Transmission in Boilers" [see "Journal," Vol. 166, p. 36]. It was pointed out that it is the thin stationary film of fluid, across which is the high temperature drop, that is the crux of heat transmission in fluids. The thickness of the film is dependent upon various factors, including viscosity and density of the fluid, and the mean velocity.

In the simplest case the resistance to the flow of heat can be divided as follows:

(1) Stationary film of gas.
(2) Metal plate.
(3) Stationary film of water.

From the results of various investigators, it has been found that the effect of the gas film is very large indeed compared with that of the metal wall and the water film; also that the heat transference is proportional to $(\text{velocity})^{0.8}$ in the case of fluids.

Among the factors which complicate the heat transference in gas condensers are:

(*a*) Scale on the water side of the tube.
(*b*) The gas is crude gas containing vapours and tar fog.
(*c*) A tar film on the gas side.

Item (*c*) becomes of increasing importance when tar is circu-

lated round the condensers to obviate naphthalene blockages. In passing, it may be stated that the practice of circulating tar through the condensers has no apparent deleterious effect on the quality of the gas, provided the amount circulated is within certain limits. A good working figure is 4 to 5 gallons of tar per 1000 c.ft. with maximum make.

It will be seen that there is a great number of factors that make investigations from the theoretical point of view problematic, while at the same time there are practical considerations which prohibit close adherence to theoretical desiderata. From the foregoing it is clear that the two outstanding requirements for good heat transmission are high gas velocity and high water velocity. In practice it is not desirable to have water velocity higher than 3 to 5 ft. per second, while, owing to requirements of design, it is usually far less than this, particularly with multitubular condensers. The following figures give some idea of the actual working results to be expected from a condenser with a medium gas velocity and a low water velocity:

Particulars of Condensers.

Maximum daily make	10 million
No. of parallel streams	3 ,,
No. of vessels per stream	2
Length of tubes	40 ft.
No. of tubes per vessel	119
Size of tubes	3 in. internal diameter 3½ in. external diameter
Diameter of containing vessel	9 ft.
Water-cooled surface per vessel	3737 sq.ft.
Air-cooled surface per vessel	*Nil*
Total cooling surface	22,422 sq.ft.
Sq. ft. ,, ,, per 1000 c.ft. per day	2·24
Velocity of gas (max. make) at N.T.P.	6·607 ft. per sec.

Hydraulic Condensers.

[Analysis of Working—Week Ended Oct. 2, 1920.]

—	To Noon, Sept. 30, 1920.	From Noon, Sept. 30, 1920.
Average inlet temperature of gas	128° Fahr.	128° Fahr.
Average outlet temperature of gas	70·7° ,,	70·6° ,,
Average make of gas per hour	375,000 c.ft.	375,000 c.ft.
Quantity of water per hour	10,000 gallons	15,000 gallons
Average rise in temperature of water	27·8° Fahr.	18·4° Fahr.
Quantity of heat extracted per hour	2,780,000 B.Th.U.	2,760,000 B.Th.U.
Heat extracted per c.ft.	7·42 B.Th.U.	7·36 B.Th.U.
Mean temperature of gas	94·4° Fahr.	94·3° Fahr.
Inlet temperature of water	63·7° ,,	66·0° ,,
Outlet temperature of water	91·5° ,,	84·4° ,,
Mean temperature of water	77·6° ,,	75·2° ,,
Working difference of temperature	16·8° ,,	19·1° ,,
Average difference of temperature outlet gas to inlet water	7·0° ,,	4·7° ,,
Total cooling surface	22,500 sq.ft.	22,500 sq.ft.
Cooling surface per 1000 c.ft. per day	2·5 ,,	2·5 ,,
B.Th.U. per sq.ft. per ° Fahr. per hour	7·3	6·16

Fig. 5 shows a water-tube condenser vessel in which the water and gas flow are parallel but in opposite directions. The end water compartments are divided from the centre or gas compartment by mild-steel diaphragm plates into which the water tubes, which are solid drawn, are expanded. It will be obvious that the governing factors of heat transmission—namely, superficial area and the cross-sectional area of the gas and water passages—in addition to being mutually dependent are affected by the diameter of the tubes used and their spacing. The usual spacing is triangular; the centres of tubes being about three diameters. It may be greatly reduced; the space between the tubes being made approximately 1 in. Thus, with tubes 2 in. in external diameter, the spacing might be 3 in., as shown in fig. 3, while fig. 4 shows a suggested arrangement of tubes in a containing vessel 2 in. to 3 in. in diameter. It must be noted that this close spacing is dependent upon the tubes having no joints in their length. For a given size of containing vessel this close spacing increases both the cooling surface and the velocity of the gas. By varying the diameter of the containing vessel, the gas velocity may be further controlled. The water velocity is dependent upon the foregoing, but may be governed independently to a certain extent by the selection of the size of the water tube.

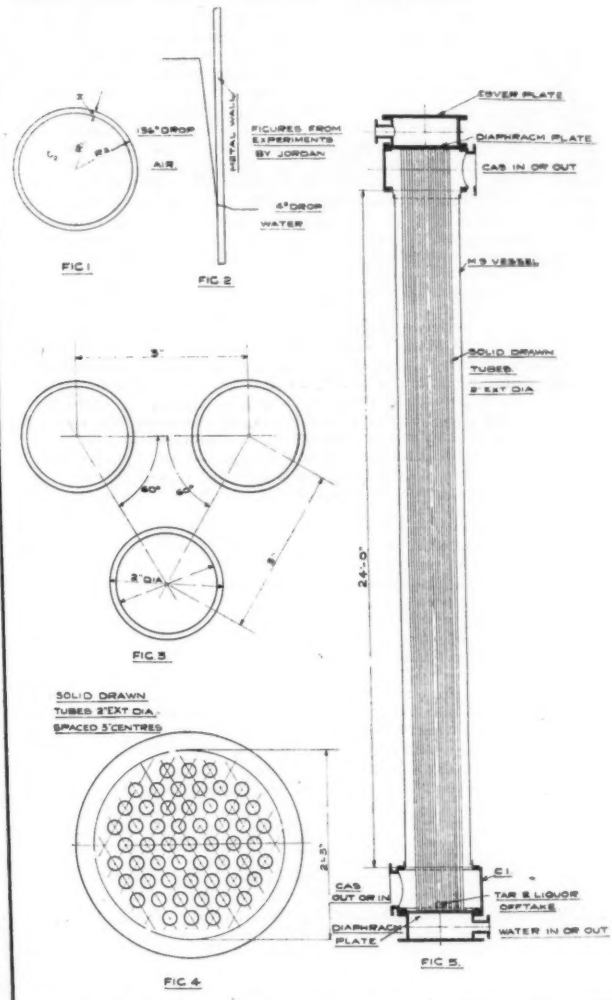
The advantage to be obtained from these increased velocities is, primarily, increased heat transmission per unit of surface for a given difference in temperature between the water and the gas. This may be utilized in different ways:

(*a*) By a decrease in the size of the condenser plant.

(*b*) By a decrease in the working difference of temperature between the gas and the water.

The former will result in any case, since the condenser is made more compact; but the size may be further reduced, since, if the heat transmission is greater per unit of surface, the requisite area is less. Alternatively the area for heat transmission may be retained at the same figure, and the increased efficiency utilized in reducing the temperature difference. Thus the outlet temperature of the water will be higher, the temperature of the metal wall will also be higher, and to a large degree shock condensation would be avoided. The tar film would be less viscous, aiding heat transmission and making naphthalene accumulation less likely.

It is obvious that increased gas velocity will necessitate a higher differential pressure across the condenser. If, however, the pressure at the condensers be investigated, it will be found that the greatest part of the pressure thrown is due to connections, and not to the vessels. Thus the necessary increase will not greatly increase the total differential pressure.



By the above suggested increases in velocity there is no reason why the heat transmission per sq. ft. per ° Fahr. per hour should not be increased at least to the region of 15 to 20 B.Th.U. A more conservative figure could be used for the purposes of design, while the surplus efficiency could be used by cutting down the amount of water supplied to the condensers, with the advantages enumerated above.

Discussion.

The CHAIRMAN said they had listened to a very interesting paper on thermal transferences in condensers. In the vessels normally used for condensation, considerable convection currents were set-up in the fluids themselves, and these had a distinct effect on the efficiency. It was an advantage to allow the hot gases to enter the condenser at the top. Had Mr. White any test figures giving more information on this point? The problem as to what actually occurred in the gas stream during the cooling process was highly interesting, but was too wide a subject to be dealt with in the present discussion.

Mr. WHITE agreed that the effect of convection currents was important, particularly when the velocities were low—in some cases they were of the order of 0·3 ft. per sec. Mr. Booth had suggested that it was advisable to allow the hot gases to enter at the top of the condensers. Water-tube condensers were, of course, designed to have a reversible flow. He regretted that he had no figures to debate the point raised by Mr. Booth.

Mr. F. A. FROST (of the South Metropolitan Gas Company) congratulated the author on his paper. The subject chosen, he said, was by no means worn threadbare, and had not received the attention which its importance warranted. With regard to the division of condensers into two groups, atmospheric and water-cooled, the author might have gone a step further, and added the words ancient and modern to the respective types. The area occupied by atmospheric condensers was eight to ten times as great as that required for the water-cooled type, and the former had many other disadvantages. Indeed, they were a legacy of a previous generation, when the conditions of manufacture and condensation of gas were very different from those obtaining to-day. In those days the retort temperatures were lower, and the main aim was to make a gas of high illuminating value. This gas was by no means stable. It had to be handled

carefully and had not to be subjected to too rapid cooling. The South Metropolitan Gas Company, many years ago, had only atmospheric condensers, and horizontal pipes adorned the retort-house walls. They could imagine how much initial cooling occurred there. As a matter of fact, in summer time, when the foul gas was at a temperature of 140° Fahr., this temperature actually increased in passing the pipes. If condensation could be regarded merely as a cooling process, it would be simple enough; but it was bound up with other considerations, not the least of which was naphthalene condensation, with its concomitant stoppage difficulties. In many works, because of these stoppages, the condensers had to be installed in duplicate; and as far as the South Metropolitan Company were concerned, the cleaning used to cost a great deal of money. So long as the temperature of the gas fell, so would naphthalene be deposited; and the obvious thing to do was to subject the gas to the lowest possible temperature. This led to the installation of hydraulic condensers. With these, it was found possible to cool gas having an initial temperature of from 150° to 170° Fahr. to within 2° of the temperature of the water entering the condensers. After this, naphthalene stoppages entirely ceased. Indeed, he knew of water-cooled condensers which had worked continuously for fifteen or sixteen years. They reversed the flow of gas; and any naphthalene remaining in the part of the condenser which was formerly cold was melted by the hot gas. In the original water-cooled condensers, which were fixed near the retort-house, this system worked very well; but when other condensers were fitted in positions such that the gas entered at a temperature of 120° to 130° Fahr., they did not get such good results. It was realized then, however, that the amount of naphthalene which tar could carry-away at this temperature was much less than at the higher temperatures; and this led to the introduction of sufficient additional tar to maintain a film in a state of constant movement, carrying the naphthalene with it. The gas leaving the condensers contained only 10 grains of naphthalene per 100 c.ft., and this was entirely eliminated by the anthracene oil in the washers.

Mr. W. T. KENSHOLE (of the Lea Bridge District Gas Company) remarked that Mr. White had given a figure of 27·8° Fahr. as representing the average rise in temperature of the cooling water. This figure seemed very low. He had taken a sample of water at the inlet and outlet of the condensers at Lea Bridge, and had tested each sample for hardness. The difference in hardness amounted to 4°—from 23° at the inlet to 19° at the outlet. It was the practice at Lea Bridge to clean the inside of the tubes with a light flexible steel scraper. Condensation was a wide subject. In many cases the modern practice was to run a long length of foul main, in which the heavy tar was condensed, leaving the lighter tars to carry away the naphthalene in the condensers.

Mr. WHITE, referring to Mr. Frost's remarks on atmospheric condensers, said that he had read a paper published only two years ago in which it was stated that with water-cooled condensers difficulty was experienced in maintaining at a definite figure the calorific value of the gas made in different retort houses. Atmospheric condensers had been resorted to, with the result that there had been an increase of 15 B.Th.U. per c.ft. in the calorific value of the gas. It was obvious from this that there were still some believers in condensers of the atmospheric type. The circulation of tar was undoubtedly a decided help in the prevention of naphthalene stoppages. The quantity of tar had a great influence. A batch of condensers in which tar was circulated continuously ran for ten years without trouble. As an experiment, it was decided to circulate the tar intermittently. After six months' working, out of 240 tubes, only 2 were not stopped-up. With another batch, on intermittent circulation of tar, after six weeks 50 tubes were blocked-up. After three months' working 100 tubes were blocked up with naphthalene to such a degree that it was impossible to push an auger through. With regard to Mr. Kenshole's remarks, the figure given for the rise in temperature of the water was a normal one. High temperatures of the outlet water would, of course, by evolution of carbon dioxide, tend to deposit temporary hardness. Consequently they should be avoided.

Mr. LEONARD LACEY (Hon. Secretary of the Association) considered that Mr. Frost's remarks on atmospheric condensers were rather sweeping. The capital cost and space required were greater; but the need for renewals, due to corrosion, in the water-cooled type could not be neglected. It had been suggested that the hot gas should enter at the top of the condensers. He did not agree with this view. If the gas entered at the bottom, the condensate travelled counter-current to the gas, and the washing-out of naphthalene was more effective.

Mr. WHITE said that the advantage of water-cooled condensers was that, even in hot summer weather, the temperature of the gas could be so excellently controlled. The low outlet temperature of the gas increased the efficiency of the washing and scrubbing processes. The use of river water sometimes resulted in corrosion; but it was always possible to circulate town water, and cool it atmospherically. With atmospheric condensers it was difficult to cool the gas to within 10° of the air temperature; while with water-cooled condensers it was easy to get within 2° Fahr.

Mr. FROST agreed that the effect of a low-temperature gas entering the scrubbing plant was highly important. In former days, when atmospheric condensers were employed at the South Metropolitan Works, they could not get a liquor of more than 5 or 6 oz. strength. Now, with condensers of the water-cooled type, they were able to cut-down the supply of water to the scrubbers to such proportions as to get a liquor of from 12 to 14 oz. strength. When it was considered that 22 million gallons of liquor had to be transported annually—which in the old days would have amounted to 40 millions—the importance of this would be realized.

Mr. WALTER GROGONO (of the Gas Light and Coke Company) suggested that the condenser of the future would be an atmospheric one with water trickling over the pipes. They had used atmospheric condensers with freedom from stoppages for 2½ years. The only precaution taken was that each day a certain amount of steam was passed into the tubes, and this melted any deposit of naphthalene. Their liquor was never under 10 oz. strength. Usually it was 12 oz. At the present time they were installing atmospheric condensers followed by water-cooled condensers. For two 4-million c.ft. streams of gas they had atmospheric condensers. In the summer time the water was allowed to trickle over the pipes. It was true that the floor space required was larger than that necessary for the water-cooled type; but they had never given any trouble.

Mr. WHITE, referring to Mr. Grogono's suggestion as to the future type of condenser, said that this had been used extensively for steam plants, but had given place to other patterns. It was impossible to rely on the cooling effect of the evaporating water, as this was a variable, depending on atmospheric temperature. Did Mr. Grogono, as a result of steaming the naphthalene deposits, have any trouble in his pump systems?

Mr. GROGONO replied that no trouble was experienced in this respect.

Mr. D. CLEAVE CROSS (Lea Bridge Gas Company) remarked that all the arguments regarding naphthalene applied to gas made in horizontal retorts. With vertical retorting there was no such difficulty. In the latter case the only trouble was from deposition of ammonium chloride; and this could be overcome by washing with liquor. In his opinion, water-cooled condensers were far preferable.

A vote of thanks, proposed by Mr. E. E. CALVERT, of the Gas Light and Coke Company, and seconded by Mr. W. J. BRAND, of the Lea Bridge Gas Company, was accorded Mr. White for his paper.

A paper on "The Modern Drawing Office, and its Place in the Scheme of Gas-Works Management" was then read by Mr. J. E. Ledingham, of the Tottenham District Light, Heat, and Power Company. This, with our report of the discussion, is held over.

CARBONIZING CAPACITY OF COKE OVENS.

Influence of Chamber Width.

"Since about 1917 the art of coke-oven construction has made very considerable progress. Economic results are obtained in coking practice on a scale that could not have been foreseen. If we inquire as to the principles of construction which give rise to them, we find that the narrow chamber type is principally responsible for these favourable results. In effective results, the heating, which has been brought to great perfection, and the uniformity of heating thereby attained, take a secondary place." This is the closing paragraph of an interesting article on carbonizing capacity, temperature distribution, and heat consumption of coke ovens, contributed to the "Iron and Coal Trades Review" for Feb. 13 by Dr. Oswald Peischer, of Essen.

A COMPARISON.

In examining the influence of the chamber width on carbonizing capacity, Dr. Peischer compares two plants with the same extent of construction plan, the same external dimensions, but with chambers differing in width and consequently in number. To enable one to form a judgment, it is important to establish what output can be attained in both cases on the same site and with the same over-all dimensions.

Let b_1 b_2 = the width of the chamber; d = the breadth of the heating wall *plus* twice the thickness of the wall; k_1 k_2 = the number of chambers; B = the length of the battery; L_1 L_2 = the plant output in 24 hours, and z_1 z_2 = the carbonizing period. Then

$$B = k_1 (d + b_1) + d = k_2 (d + b_2) + d.$$

From which

$$\frac{k_2}{k_1} = \frac{d + b_1}{d + b_2} \quad \ldots\ldots\ldots \quad (1)$$

The carbonizing capacity of the plant is:

$$L_1 = k_1 \times \frac{24}{z_1} \times b_1 \times n$$

and

$$L_2 = k_2 \times \frac{24}{z_2} \times b_2 \times n$$

In these equations n is a coefficient depending on the dimensions assumed to be identical in both cases—namely, the height and length of the chambers, and the weight per unit volume of the coal. Further, it is seen that

$$\frac{L_2}{L_1} = \frac{k_2}{k_1} \times \frac{b_2}{b_1} \times \frac{z_1}{z_2}$$

and with the use of equation (1):

$$\frac{L_2}{L_1} = \frac{d + b_1}{d + b_2} \times \frac{b_2}{b_1} \times \frac{z_1}{z_2} \quad \ldots\ldots\ldots \quad (2)$$

In this expression, d has the value of 500 mm. minimum. The maximum chamber width may be assumed as 500 mm. (19·7 in.), and the minimum as 350 mm. (13·7 in.). Thus there results the equation

$$\frac{d + b_1}{d + b_2} \times \frac{b_2}{b_1} = \frac{1000 \times 350}{850 \times 500} = 0{\cdot}822$$

The reduction in the useful volume of coal due to the diminution of the chamber width accordingly reduces the carbonizing capa-

city of the oven. The influence of the carbonizing period is indicated by the quotient $\frac{z_1}{z_2}$. The gross carbonizing period is longer by the time required for pushing and charging the chambers, and is 24 and 12 hours respectively. Then:

$$\frac{z_1}{z_2} = \frac{24}{12} = 2$$

Hence, the influence of the carbonizing period is extremely great. The total result is an increase in carbonizing capacity of

$$\frac{L_2}{L_1} = 1{\cdot}644$$

In other words, on a given ground plan, with the use of chambers 13·7 in. in width a 64 p.ct. higher carbonizing capacity can be attained than in a plant with chambers 19·7 in. wide. From this, the economic advantage of using narrow chambers is obvious.

CONSTITUTION OF THE COKE.

The width of the chamber influences to a certain extent the constitution of the coke, though this is substantially determined by the coal used. With a wide chamber the path of the distillation gases flowing to the chamber wall is lengthened. Since the coking speed is at the same time reduced, the rate of flow of the gases is also retarded, and they remain in contact with the incandescent coke for a longer period and on a longer path. Consequently the wider the chambers, the greater the extent to which gas decomposition and carbon deposition, with thickening of the cell walls on the coke surface, occur. This phenomenon is further intensified by the generally higher temperature of the walls in wide chambers and of the coke layers next to the walls. Consequently, to produce a homogeneous, easily-combustible coke for blast furnaces and domestic use, the narrow chamber has its advantages.

DISTRIBUTION OF TEMPERATURE.

With the reduction of the chamber width and the recognition of the importance of pushing the coke at the right moment after complete carbonization, increased importance was attached to uniformity of heating. Owing to the absence of all heat compensation through over-carbonizing in the chambers, inequalities in the heating are immediately recognizable by the dark or light patches in the coke mass. Chambers not tapering in a vertical direction, such as were used exclusively up till 1919, tend to become hotter below than at the top. By measuring the temperature progression at different heights in the centre of a chamber with parallel walls, the fact may be established that the upper portion of the mass may often require another two hours, or even more, to reach the temperature of the lower portion. Once it was realized that overheating reduced the combustibility of the coke, and since the requirements in respect of uniformity in the properties of the coke from the same oven became more stringent, coke oven constructors turned their attention to this question also. Koppers solved the problem by making use of the experience gained, which showed that, by shortening the heat path, the speed of coking was enhanced at an increased rate. The chambers were made narrower at the top than at the bottom. Since the coking speed increases very rapidly with a reduction in the width of the chamber, a relatively slight taper suffices to ensure an even progress in carbonization at all levels in the charge, despite the fact that the wall temperature decreases towards the top.

HEAT CONSUMPTION.

The heat requirements of a coke oven are: Gas and vapour heat, coke heat, radiation and convection, and loss by waste heat. The gas heat is a constant quantity which can scarcely be influenced. Of the coke heat, the amount lost by quenching is greater the wider the chambers, for with the increase in their width the temperature prevailing in the outer layers of coke, which has to be conveyed to heat up the centre, also increases. Furthermore, the coke heat assumes unprofitably high proportions if the heating is not uniform. The item in heat expenditure most easily influenced is that due to radiation and convection. This can be substantially reduced by effective heat insulation of the oven, as well as by the use of narrow chambers, since, with the same over-all oven dimensions a considerable increase in carbonizing capacity is obtained with narrow chambers, so that the heat losses in respect of radiation and convection are reduced in the same proportion.

Lobelin "Ingelheim."—This is a product of the laboratories of C. H. Boehringer Sohn Chas. Zimmermann & Co. (Chemicals), Ltd., Nos. 9-10, St. Mary-at-Hill, London, E.C. 3. It is the hydrochloride salt of the alkaloid obtained from *Lobelia Inflata*, which, dissolved in water, forms a stable solution. It is, state the firm, a reliable therapeutic agent in apnœa and in progressive paralysis of the respiratory centres, for which condition it may be regarded as a specific stimulant. It is claimed to be particularly useful in cases of coal-gas asphyxia. Its action is practically instantaneous, without producing untoward toxic results. It supports the circulation by warding off asphyxia where cardiac failure is consequent on inadequate breathing. Full information can be obtained from the firm at the above address.

The Coke Competition.

We are indebted to "Das Gas- und Wasserfach," the official organ of the German Gas and Water Association, and of other representative bodies of the gas industry in that country, for making known to its wide circle of readers the details of the Coke Competition. In the last issue to hand—that for March 14—the circumstances leading up to the competition are described, and the German journal remarks that "a very agreeable duty has been allotted to us in a definite request by our English contemporary that we should make known the conditions of the competition, and invite participation in it." Full details are subsequently set out, and, in view of the keen interest which is being taken in coke in Germany at the present time, we have no doubt that the considerable space which our contemporary so kindly devotes to the matter will evoke widespread interest among its readers.

Gas for Lighting-up Steam Wagon Fires.

In the "JOURNAL" for March 19, 1924, reference was made to the use of high-pressure gas burners for lighting-up the fires of steam lorries. It was mentioned that, by installing these burners, which are a product of Messrs. Keith & Blackman Company, Ltd., of 27, Farringdon Avenue, E.C. 4, Messrs. Viney & Co., Ltd., of Preston, had reduced their fire-lighting costs by over 6d. per fire, in addition to saving space and ridding themselves of the trouble of dirt and inflammable litter. It is of interest to relate the experience of another well-known firm of motor engineers who have installed this system, and light-up their fleet of "Foden" wagons by the Keith apparatus, comprising compressor and special portable burners. Before using these burners, the cost of lighting-up, including wood, labour, and storage, was approximately 1s. 3d. per fire. Now, they state, the cost is 4d. per fire, inclusive of all charges. Further, the adoption of the new system has resulted in the elimination of 50 p.ct. of the smoke nuisance caused by lighting-up with wood and paraffin waste.

An Instrument Catalogue.

Catalogues have ceased to be mere lists of apparatus; they have in many cases become very useful reference books. Into this class falls an interim catalogue which has just been issued by Messrs. Alexander Wright & Co., Ltd., of No. 1, Westminster Palace Gardens, S.W. 1. In it, all manner of useful gas-works instruments are illustrated and described. There is, for example, a dead-beat indicator of differential pressure, which shows at a glance the loss of pressure in any part of a system. Then there is a device for ensuring that the running of an exhauster shall effect exactly the amount of pull required on the hydraulic main—or, rather, it will betray at once the fact that the exhauster is not so running. One of the illustrations is of a battery of gauges used in connection with the "Reflux" system of retort-house control; others show various types of complete gas analysis apparatus. So we could continue; but rather than do this, we suggest that gas engineers interested in the subject should apply to Messrs. Alexander Wright for a copy of this list, which contains more than a hundred pages of descriptive matter and about 140 illustrations.

Combination Gas and Electricity Schemes.

Messrs. Drake and Gorham, Ltd., of 36, Grosvenor Gardens, S. W. 1, have been interesting themselves in the question of the combination of electricity supply with existing gas undertakings. They calculate that there are in this country about 1000 gas undertakings operating in districts where a public supply of electricity is not available. Many of those districts would be incapable of profitably maintaining two competing supplies; and this naturally would be to the detriment not only of the undertakings, but of the communities in those areas. In view of this, the firm emphasize the desirability of gas undertakings acquiring the necessary powers to supply electricity in conjunction with their gas service. This is a question which has frequently been discussed and raised in the columns of the "JOURNAL." It is quite clear from existing examples of combination that several economies are realized by working the two systems from one site, through one establishment, and under one management. One of the economies which naturally suggests itself is the utilization for generating purposes of fuel produced on the gas-works, and, where economy can be shown, the application to steam raising of waste heat from retort-settings or water-gas plant. Mr. B. M. Drake, the Chairman of Messrs. Drake and Gorham, has been discussing this matter with several prominent gas engineers; and we understand that, as a result of his researches into the available waste heat on gas-works, and consideration of the problem of its utilization, he is firmly of opinion that it might be turned to very profitable account for electricity generation. Mr. Drake will be pleased to assist any gas undertaking which may be contemplating the adoption of a scheme of electricity supply. It is further understood that, in view of the fact that the question of finance is likely to arise in many cases, Messrs. Drake and Gorham—providing sufficient support is given to the proposal by gas undertakings—contemplate the formation of a Finance Company to deal specially with the problem and so stimulate the suggested development.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Unsealed Dip-Pipes and a Simple Alarm.

SIR,—I observed the letter signed "Ad rem" in the current issue of the "JOURNAL." My statement, however, does not need correction, as it is quite true that the movement of the water-level in the large chamber is multiplied several times in the float chamber. Of course, the difference between the water-levels in unequal chambers will vary exactly as the pressures; but the greater the disparity in area between the large and small chambers, the nearer the displacement of water in the latter will approach to the actual pressure exerted on the surface of the water in the large chamber.

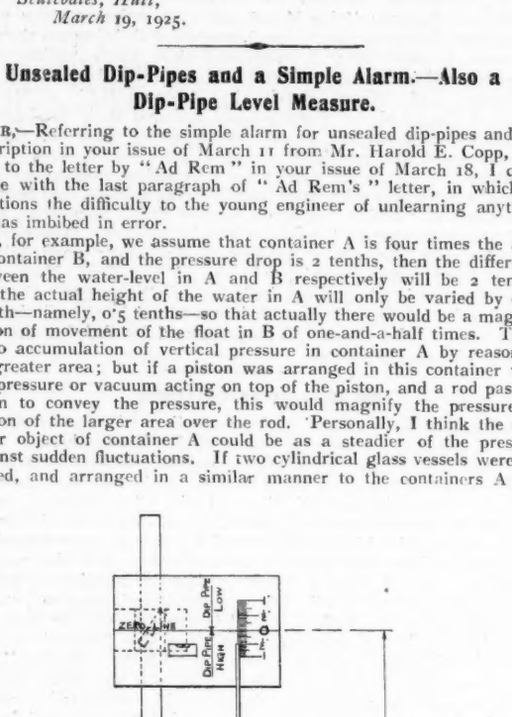
HAROLD E. COPP,
Engineer and Manager.

British Gas Light Company, Ltd.,
Sculcoates, Hull,
March 19, 1925.

Unsealed Dip-Pipes and a Simple Alarm.—Also a Dip-Pipe Level Measure.

SIR,—Referring to the simple alarm for unsealed dip-pipes and the description in your issue of March 11 from Mr. Harold E. Copp, and also to the letter by "Ad Rem" in your issue of March 18, I quite agree with the last paragraph of "Ad Rem's" letter, in which he mentions the difficulty to the young engineer of unlearning anything he has imbibed in error.

If, for example, we assume that container A is four times the area of container B, and the pressure drop is 2 tenths, then the difference between the water-level in A and B respectively will be 2 tenths, but the actual height of the water in A will only be varied by one-fourth—namely, 0·5 tenths—so that actually there would be a magnification of movement of the float in B of one-and-a-half times. There is no accumulation of vertical pressure in container A by reason of its greater area; but if a piston was arranged in this container with the pressure or vacuum acting on top of the piston, and a rod passing down to convey the pressure, this would magnify the pressure by reason of the larger area over the rod. Personally, I think the only other object of container A could be as a steadier of the pressure against sudden fluctuations. If two cylindrical glass vessels were obtained, and arranged in a similar manner to the containers A and B, and a gas pressure connected in a similar manner, it would then be possible to see the actual variations in the water-levels.



Dip-Pipe Level Measure.

While it is probably a good thing to have an alarm which can be relied upon to give warning in case of excessive pull when working with dip-pipes at no seal or only a small seal, I think it is advisable that the dip-pipes should be made level and comparable with each other; and I am sending under separate cover a sketch showing an arrangement which I have designed for measuring accurately the level of the bottom of the dip-pipes in relation to the water in the hydraulic main. This you will see consists of a float weighted at the base, and with a rod in the centre carried up to a convenient height; also a hook rod made of about ⅜ in. by ⅛ in. flat bar, to the top end of which is fixed a board having a level and an indicator showing in 1/16ths of an inch a vertical scale—the zero being marked along a centre line passing right across the board.

The diagram, I think, will be self-explanatory; but it might be as well to mention that the distance from the inside of the hook to the zero line on the board and the water-level on the float to the top of the wire pointer should be exactly the same—the float always remaining at its fixed position, while any variation in the dip-pipe is shown on the indicator by the rise or fall of the board. A small spirit-level is fixed to the latter, to enable the board to be kept level at each reading. I might say that I have employed this for a large number of retorts, and it has been most useful; the readings only taking a few seconds each, and being absolutely reliable. Any oscillation in the water quickly subsides, and the reading can be taken with accuracy.

When levelling the dips with each other, it is advisable to have the water-level approximately ½ in. below the bottom of the dip-pipe, and after the first reading has been taken to lower the indicator board on the measuring rod so as to read zero when the float is in the water. Any subsequent readings will then show the dip-pipes either high or low, as the case may be, and any alteration that may be necessary is shown without calculation.

If you think any further description in working would be useful, I shall be pleased to give it.

OSWALD H. INGHAM, M.I.Struct.E.

20, Broughton Road, South Shields,
March 21, 1925.

Reversing Valve.

SIR,—In your issue of the 4th inst. extracts are given from an application and specification No. 227,623 by Messrs. R. Dempster & Sons, J. E. Horsfall, and H. Lumb, of Elland, for a patent reversing valve, accompanied by a drawing, which is practically a copy of the valve made and supplied for a large purifier installation for the Melbourne Gas Company, Australia, by Messrs. C. & W. Walker, Ltd., in the year 1912, and is covered by my patent No. 28,207, which was granted to me in 1908.

A considerable number of these valves have been supplied and fixed in connection with gas purifier installations in this country and the Colonies since that date; and the valve is illustrated in the purifier pamphlets issued by Messrs. C. & W. Walker. I might add that it has been found useful in prolonging the period of activity of the purifier material in a number of gas-works, and has been in constant operation for many years.

R. J. MILBOURNE.

Lilleshall Old Hall, Nr. Newport, Salop,
March 23, 1925.

Rates of Carbonization.

SIR,—In the data on "Rates of Carbonization" published in the "JOURNAL" for Dec. 24, 1924, p. 851, case (3), Test 5, the average combustion chamber temperature should be 1030° C., instead of 1013° C. This error was recently discovered in going over the original record. The effect of this correction is as follows:

As before:

$$\text{Ratio of throughputs} = \frac{6{\cdot}22}{3{\cdot}196} = 1{\cdot}946$$

$$\frac{T^4_2}{T^4_1} = 1{\cdot}847$$

Difference = 5·1 p.ct., instead of 16 p.ct. as originally reported.

The emendation brings case (3) into close agreement with cases (1) and (2), and to this extent strengthens the evidence for the apparent relationship between temperature and rate of carbonization.

R. E. THWAITES, M.A.

State Electricity Commission of Victoria, Yallourn,
Feb. 12, 1925.

New Vertical Retorts at Oldbury.

SIR,—Referring to the interesting account of the above in the current issue of the "JOURNAL," and to the names of the gentlemen who have held the position of Engineer to the Oldbury Gas-Works since its inception, I notice that your particulars on this point are not as full as they might be.

The late Mr. Adam Cooke was Engineer, Manager, and Secretary to the Oldbury Gas Department for 22 years, from August, 1892, to August, 1914. Mr. C. H. Carder's connection with Oldbury extended from August, 1914, to March, 1924, when he was appointed to his present position at Rio de Janeiro.

Z. X. W.

March 19, 1925.

Sutton Gas Company.—The Directors are again able to report satisfactory working results; the revenue account showing a balance of £14,047 for the year. An interim dividend of 4 p.ct., less income-tax, was paid in August last, and the Directors recommended the payment of a final dividend of 4 p.ct., making 8 p.ct. for the year. The price of gas has remained at 9 2-5d. per therm throughout the year. During the year the Directors were able to make an issue of £15,430 5 p.ct. perpetual debenture stock at 97.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Progress of Bills.

A report was presented from the Select Committee appointed to consider the Uckfield Gas and Electricity Bill that they had not proceeded with the Bill, no parties having appeared in opposition. The previous Orders were discharged, and the Bill committed.

Gas Regulation Act.

A copy was presented of the Draft of a Special Order proposed to be made under section 10 of the Act, on the application of the Gloucester Gaslight Company.

HOUSE OF COMMONS.

Progress of Bills.

The Statutory Gas Companies (Electricity Supply Powers) Bill has been read a second time, and committed to a Standing Committee.

HOYLAKE AND WEST KIRBY URBAN DISTRICT COUNCIL BILL.

HOUSE OF LORDS COMMITTEE.—Wednesday, March 18.

(*Before the* EARL OF CLARENDON (*Chairman*), *Earl* LOVELACE, *Lord* LILFORD, *Lord* ERSKINE, *and Lord* HINDLIP.)

The object of the Bill is to carry into effect an agreement for the transfer to the Urban District Council of the undertaking of the Hoylake and West Kirby Gas and Water Company, the transfer to take place on June 30 next. (See "JOURNAL" for Jan. 14, p. 83.) The only opposition was by the Wirral Rural District Council, in some of whose parishes the undertaking supply gas and water. The petitioners did not object to the promoters acquiring the undertaking of the Company, but asked for certain provisions to be inserted in the Bill, the most important of which was to give them an option to purchase that part of the water undertaking which was within their district.

Counsel for the Bill was Mr. W. E. TYLDESLEY JONES, K.C., and the opponents were represented by Mr. JACQUES ABADY.

Mr. TYLDESLEY JONES said that the Company was a sliding-scale one, with a standard price of 13·6d. per therm. As showing the importance of the rural and urban areas, he said that in 1924 the latter produced five times as much revenue as the former. The Urban District Council were to pay £187,000 for the undertaking, and to take over the debts and liabilities (other than mortgage debts) of the Company existing on June 30, 1925. At present these amounted to about £20,000. Of this, £15,000 represented an overdraft from the bank, and the other £5000 constituted the ordinary trading liabilities. There was no suggestion by the opposition that the sum was unreasonable. This was not the first time that the Council had tried to buy the undertaking. In 1920 they had agreed with the Company to purchase, but the agreement had not fixed the price; it had provided that this should be agreed later by the Company and the Council, or, failing agreement, should be settled by arbitration. The Bill to confirm this had been put before the ratepayers of the urban district, but the uncertainty as to the price which they would have to pay for the undertaking had impressed itself so much upon them that they had rejected it. The agreement embodied in the present Bill was approved by the shareholders of the Company in December, 1924; and in January, 1925, the ratepayers had approved of it, almost unanimously. It could be taken that the present Bill had the approval of the ratepayers. As to the opposition of the Wirral Rural District Council, first, they wanted an option to purchase the water undertaking in their area. The Urban District Council could not agree to this. There were, however, a number of points raised, on which the promoters had been able to meet the Rural District Council. The latter desired representation on the Gas and Water Committee of the Urban District Council, but, in so far as water supply was concerned, only until they purchased the water undertaking in their district, if they did so. He was willing to give this representation, but it would have to be proportionate to the revenue produced in their area. It was also objected that the maximum price set out in the Bill—namely, 1s. 3d. per therm—was too high. This was higher than the price at which the Company were supplying at present, but, of course, there must be a margin. The next point raised by the Rural District Council was that the Urban District Council ought to put into the Bill clauses giving power to the appropriate Government Departments to revise the maximum prices for water and gas. He would agree to this, and he believed that the Rural District Council would not press the point with regard to the reduction of the maximum price.

Mr. JACQUES ABADY said that, with a revision clause, it was reasonable that there should be a margin between the maximum price and the selling price, and he would not press the point.

Mr. TYLDESLEY JONES said the next point referred to the power sought by the Urban District Council to lay mains in private streets. The Rural District Council had asked for what was a very common form of clause, providing that, before the Urban District Council laid mains in such streets, they should give notice to the local authority concerned. He agreed to the insertion of such a clause. Objection was then taken in respect of the power sought in the Bill to create a reserve fund out of revenue in respect of gas and water. Counsel contended that the promoters must have a reserve fund to provide for unexpected expenses, the maintenance of plant, &c.; and they had asked that the maximum amount in the reserve fund in respect of water should be 10 p.ct. of the water capital, and, in respect of gas, 20 p.ct. of the gas capital. The Rural District Council objected that the amounts which could be allocated to reserve were too high, and he was willing to limit the maximum in each case to 10 p.ct. Finally, the Rural District Council asked for a provision to ensure that the Urban District Council did not make a profit out of the undertaking, which profit could be applied to relief of rates—in other words, that the Urban District Council should not be allowed to make a profit out of the rural district for the benefit of the urban district. The Urban District Council were not acquiring the undertaking in order to make a profit, but in order to carry it on for the benefit of the public, and, therefore, they were willing to insert a provision such as suggested by the Rural District Council.

Mr. *Arthur Collins* (Financial Adviser to Local Authorities) then gave evidence as to the reasonableness of the price to be paid to the Hoylake and West Kirby Gas and Water Company by the Urban District Council for the whole undertaking—namely, £187,000, *plus* debts and liabilities. In his view, the terms arranged were perfectly fair and reasonable, both to the consumers and the proprietors of the undertaking. It had been laid down in the Bill that, until the day of the transfer, the Company were to carry on the undertaking in the ordinary course of business, maintaining normal quantities of consumable stores, but were not to enter into new capital commitments exceeding £2500 in any one particular without first obtaining the approval of the Urban District Council. This, he said, was the usual provision.

Mr. ABADY said that the reason why the Rural District Council did not desire an option to purchase that portion of the gas undertaking which was in their district was that they were in process of obtaining an Order from the Minister of Transport empowering them to supply electricity in the whole of the rural district.

A discussion then took place with regard to the financial provisions, as the result of a report from the Ministry of Health. The main discussion centred around the periods to be allowed for the repayment of loans. The provisions in the Bill were that the period of repayment of the £187,000 loan for purchasing the undertaking should be sixty years; for the loan in respect of further sums payable by the Council under the agreement, and for defraying the costs and expenses incidental to the purchase and transfer of the undertaking, other than the costs of the Act, the period was fifty years; for the provision and laying of mains for the gas undertaking (£15,000), forty years; and for the provision and laying of mains for the water undertaking (£22,500), forty years. The Ministry suggested that the periods were too long in some cases. As the result of the discussion, it was decided by the Committee to fix the period for the repayment of the loan in respect of purchase at fifty years, instead of sixty, and to leave the remainder as stated.

A discussion then arose, as the result of reports from the Board of Trade, the Ministry of Transport, and the Home Office, on a clause in the Bill giving the Urban District Council power to refuse to supply gas or electrical energy to any person whose payments for the supply of either gas or electrical energy, or meter rent, were in arrears, whether such payments were due in respect of the premises to which the supply was demanded, or in respect of other premises.

Mr. TYLDESLEY JONES said that, if the Council were supplying both electric light and gas, an electric light consumer, under the ordinary law, might refuse to pay his bill, and the Council could cut off the supply of electricity. But the consumer could then demand a supply of gas, and the Council would be compelled to give it, and thus allow him to run up another bill. The Board of Trade objected to the proposal in the present Bill, and said, in effect, that if a man would not pay his electric light bill, he must still be supplied with gas. Why should a public department be out to help defaulters? The Board of Trade report stated that the clause in the present Bill was much wider in its scope than clause 32 of the House of Lords Model Bill, and would enable the Council to cut off the supply of gas or electricity in the event of payments being in arrear in respect of either commodity supplied to any premises occupied by the same consumer, irrespective of the circumstances in which, and the period for which, payments might be in arrear. The model clause referred to provided that, if a person had previously quitted premises without paying gas charges and meter rent, the undertakers could refuse to furnish him with a supply of gas in new premises until he paid them.

Mr. H. C. HONEY (Director of Gas Administration at the Board of Trade) said there would be no objection to a suggestion that the model clause should be made to apply to electricity as well as to gas. But the promoters wanted to go further than that. It would mean that if a man had two or three businesses in the same town, he might have a legitimate dispute about his gas bill in one set of premises, but, under the suggested clause, if he did not pay the bill, the undertakers could cut off the electric light on his other premises.

The CHAIRMAN said this was a different case from that put by Counsel.

Mr. HONEY agreed, but said that the suggested clause would cover that.

The CHAIRMAN said that it might be met by the insertion of certain words.

Mr. TYLDESLEY JONES said his answer to Mr. Honey's criticism was that, if he cut off the supply unlawfully, he was liable to heavy damages. The Council would not cut off the supply in the case of a dispute. Both the Ministry of Transport and the Home Office reports had stated that the powers of one undertaking should not be used as a lever to secure payment in respect of another undertaking.

Mr. HONEY said the Board of Trade had not raised this point.

The officials of the Home Office and the Ministry of Transport were not present to discuss the matter; and finally it was agreed that the Bill should be ordered to be reported, and that if the Lord Chairman, when considering the clauses, required a modification, the promoters could discuss it with him.

A clause which was withdrawn from the Bill at the suggestion of the Board of Trade was that by which the promoters sought freedom from obligation to supply gas for other than lighting or domestic use where the capacity of the main was insufficient. This clause is still the subject of negotiation between the gas industry and the railway companies.

HORLEY DISTRICT GAS COMPANY (ELECTRICITY SUPPLY) BILL.

HOUSE OF LORDS COMMITTEE.—Wednesday, March 18.

(*Before the Earl of* Clarendon (*Chairman*), *Earl* Lovelace, *Lord* Lilford, *Lord* Erskine, *and Lord* Hindlip.)

This Bill proposes to empower the Horley District Gas Company to supply electricity, jointly with their gas undertaking, for public and private purposes, within so much of their gas limits as is not included in the area of supply of the Sussex Electricity Supply Company, Ltd., and to raise additional capital. (See "Journal" for Jan. 21, p. 143.) There was opposition by the Horley and District Electricity Supply Company, Ltd. (registered in October, 1924), who have applied for a Special Order authorizing them to supply electricity within the parish of Horley and an adjoining part of the parish of Charlwood.

Counsel for the Bill were Sir Harry Courthope-Munroe, K.C., and Mr. Jacques Abady. The petitioners were represented by Mr. W. E. Tyldesley Jones, K.C., and Mr. F. G. Wrottesley.

Sir Harry Courthope-Munroe, K.C., opening his case, referred to the growing practice among gas companies to ask for powers to supply electricity, which had now reached a stage where its advantages were beyond dispute. Substantially, gas represented heat, and electricity represented light, and it had been found by no means inconsistent to put the supply of the two commodities in the hands of one undertaking. Parliament had authorized 21 gas companies to supply electricity, and in cases where this had been done, there had been an increase in the supply of both. There were obvious savings to be effected by this practice, as, for instance, in connection with overhead charges, and with the breaking-up of streets for laying mains. Again, the waste heat arising from the operation of gas plant could be utilized in connection with the generation of electricity, and the saving of fuel effected thereby would mean an immense saving of costs. In the present case, the Directors of the Horley District Gas Company had decided, in November, 1922, that, though their district was a small residential one, and would not yield large profits in the early stages, it was growing, and it was time to apply for power to supply electricity. Owing to the state of the law as it now stood, however, the Company, being a statutory one, could only do this by going to Parliament for a Bill, whereas any body other than a statutory gas company could avail themselves of the provisions of the Electric Lighting Act of 1888, as amended by the Electricity (Supply) Act, 1919. Under the original Act of 1888 the Board of Trade could grant a Provisional Order, which required confirmation by Bill, so that the promoters had to go to Parliament. In 1919 the Electricity Commissioners had taken over the powers previously exercised by the Board of Trade in regard to electrical matters. An extraordinary state of affairs had arisen, and the present case was an almost unique instance of injustice. In 1924 Mr. R. G. Clarry (M.P. for Newport) had introduced a Bill into Parliament to enable statutory companies to obtain Orders from the Electricity Commissioners, in the same way as non-statutory companies. That Bill was unopposed, and would have gone through, but, in the political upheaval of 1924, it was submerged. The Bill had been presented again this year, and had passed second reading. The Horley Gas Company had not wished to go to the expense of promoting a Bill in Parliament, because it looked as though Mr. Clarry's Bill would be passed, and it would be cheaper for them to go to the Electricity Commissioners. It was decided to await the passage of Mr. Clarry's Bill, and on June 7, 1924, the Secretary of the Gas Company had given formal notice to the Electricity Commissioners that powers to supply electricity were to be applied for. Similar notice was given to the Board of Trade. On July 15, however, the Company had passed a resolution, in view of the uncertainty with regard to the passage of Mr. Clarry's Bill, to promote a Bill, and added that the Commissioners be informed. On Oct. 18 the parliamentary notice of that intention was published. In October, also, the Horley and District Electricity Supply Company, Ltd., were registered, and applied to the Electricity Commissioners for an Order empowering them to supply. The Act of 1919 provided that the Commissioners "may" hold an inquiry in these cases; but, though the Gas Company had given notice several months before of their intention to apply to Parliament, the door was slammed in their faces. No inquiry was held, the Gas Company were never heard, and on Jan. 20, 1925, the Electricity Commissioners had made an Order in favour of the Electricity Company, which was to be confirmed by the Minister of Transport. It was provided in the 1919 Act that the Minister of Transport "shall" hold an inquiry if a memorial were presented, and the Gas Company had presented a memorial. Thus, the Electricity Company appeared before the Committee "half clothed," with the possibility of obtaining an Order.

A report had been submitted in connection with the present Bill by the Ministry of Transport; and he ventured to think that it was dictating to the Committee the course it should adopt. In this report it was stated that the Electricity Commissioners had submitted to the Minister of Transport for confirmation the Order to authorize the Electricity Company to supply, and that the Minister understood that the application for the Order was supported by the Reigate Rural District Council, in whose district the parishes to be supplied were situated. Counsel said the real position was that the Reigate Rural District Council were not objecting, and were not taking sides; but this was a different thing from "supporting" the application. The report went on to state that the Electricity Commissioners had been satisfied with the technical scheme, and as to the financial ability of the Electricity Company to carry it into effect. Counsel said that this was purely and simply *ex parte*, and the Commissioners had merely seen no grounds for refusing to grant the Special Order. They had not heard the Gas Company. The report continued that the Minister was advised that it was contrary to the general practice, and would not be conducive to the public interest, to invest two separate bodies with power to supply electricity in the same area. Was that, asked Counsel, a suggestion to the Committee to throw out his Bill, when he had never had a chance of putting it before anybody? It was the Minister's duty to adjudicate, and to hold the scales between the two parties, and not to shut the door in the face of one of them. He said he was not sure that the Electricity Company, who at present had no powers at all to supply anybody, had any *locus standi* at all. He did not ask the Committee to decide this, however, but implored them to consider this Bill on its merits, and apart from what had occurred. With regard to the area of supply, Counsel said that, if the Bill were passed, the Sussex Electricity Supply Company, who had power to supply electricity in a small part of the Gas Company's existing limits, would be prepared to take a bulk supply of electricity from the Gas Company, so that, in effect, the area covered by the Gas Company in respect of electricity would be the same as the area of supply for gas. The authorized share and loan capital of the Gas Company at present was £88,000, and the unexercised capital powers were about £20,000. In the Bill they were asking for additional capital up to £30,000, with borrowing powers up to half that amount, making in all an additional capital of £45,000. The capital required in the first year under the present scheme would be about £14,000, which would include plant for utilizing the waste heat from the gas-making plant. This waste heat alone would produce, in the first year, three-quarters of the electricity generated. They were on the fringe of a new epoch in this matter. The utilization of waste heat was very important; and this was one of the reasons why he asked the Committee to go into the matter fully, and to disregard the extraordinary position which had been brought about by the legislature.

Mr. Broadberry's Evidence.

Mr. *A. E. Broadberry* (late Chief Engineer and General Manager, and at present a Director, of the Tottenham District Light, Heat, and Power Company) said that he was one of those who advocated that both public and private interests would be best served if the supply of electricity, where possible, were in the same hands as the gas supply. He referred to the successful manner in which the Tottenham District Light, Heat, and Power Company had developed the Wood Green area in respect of electricity supply, as showing the good results obtained by carrying on the gas supply in conjunction with electricity supply. There were many economies arising from the supply of electricity by gas companies. In the first place, management was less costly, as staffs did not need to be duplicated. It was also realized that the heat arising from gas manufacture, which had been wasted for years, should be properly utilized, and his Company were utilizing waste heat for generating electricity for their own purposes at the gas-works. Another advantage resulting from the exercise of electricity powers by a gas company was in connection with the raising of capital. The method of raising capital by sliding-scale companies was beneficial. In order that the community should get an advantage out of the improved value of the capital, it had to be issued either by public tender or public auction, and any premiums obtained bore no interest, and had to be used in the development of the undertaking without any charge. The only case in which an electrical undertaking could get the advantage of the increased value of the capital raised under the sliding-scale was where the electricity supply was in the hands of a gas company. The development of gas and electricity supply side by side by the same company would enable economies to be effected in connection with the breaking-up of streets and the laying of mains. He believed the Horley Gas Company could make a success of electricity supply in Horley; but he would not put his money into an electricity company in such an area.

The Committee adjourned until Friday, March 20.

SCARBOROUGH CORPORATION BILL.

When this Bill was considered by a Committee of the House of Lords, presided over by the Earl of Clarendon, on Tuesday, March 17, the opposition to the Bill by the Scarborough Gas Company had been met. The opposition was in respect of powers sought by the Corporation to carry out street works. The petition stated that the street works proposed to be authorized would, if constructed, be executed in existing streets and roads in which some of the mains and pipes of the Company were laid, and the supply of gas would be liable to be interrupted. No sufficient provisions were contained in the Bill for preventing the exercise by the Corporation of the powers of the Bill interfering with the compliance by the Company with their statutory obligations to supply gas, or for enabling them to recover from the Corporation any increased expense to which they would be put, or compensation for loss and injury.

The petition was withdrawn on the insertion in the Bill of a clause to protect the Company. This provided that at least fourteen days (except in the case of emergency) before the commencement of any of the works authorized in any street within 5 ft. from any apparatus of the Company, the Corporation are to submit plans and sections of the works proposed to be executed, and to give notice of the date of commencement. The Corporation are also to give to the Company such further information with regard to those works as the Company reasonably require. If it should appear to the Company that the construction of any of the works would interfere with or endanger any of their apparatus, or impede the supply of gas, they may give notice to the Corporation to alter the position of, or to protect, such apparatus, or substitute the apparatus in such manner as may be reasonably necessary. These alterations or works are to be done at the expense of the Corporation, but to the reasonable satisfaction and under the superintendence (if such superintendence shall be given) of the Engineer of the Company. If the Company give notice to the Corporation within seven days after the receipt of the notice of the intended commencement of the work, the Company may themselves carry out such alteration, protection, or substitution as may be reasonably necessary; the cost to be met by the Corporation. Where the Corporation shall add to the roadway any portion of any footway in which there shall be placed any apparatus belonging to the Company,

the latter may, at the reasonable cost of the Corporation, alter the position or depth of such apparatus as may be reasonably necessary to protect them. The Company are to give notice of any alteration desired within seven days after the receipt by them of the plans and sections already referred to. If the plans and sections are not objected to by the Company within fourteen days of their delivery, the works are to be executed by the Corporation. If any interruption of the supply of gas is occasioned by the construction of any of the works authorized for a longer period than reasonably necessary, the Corporation are to compensate the Company at a rate not exceeding £10 per day during the continuation of the interruption. The expense of repairs or renewals of apparatus rendered necessary by the Corporation shall be paid by them, and may be recovered by the Company in any court of competent jurisdiction. Differences are to be settled by arbitration under the provisions of the Arbitration Act, 1889.

BOLTON CORPORATION BILL.

This Bill was considered by the Local Legislation Committee of the House of Commons on Tuesday, March 17, and the clauses relating to the gas undertaking (see "JOURNAL" for Jan. 21, p. 142) were approved. There were no alterations, except that the clause by which the Corporation seek freedom from obligation to supply gas for other than lighting or domestic use where the capacity of the main is insufficient, has been withdrawn. The form of this clause is still the subject of negotiation with the railway companies. The Bill also includes borrowing powers in respect of the gas undertaking; the amounts being £10,000 for the provision of meters and £190,000 for the general purposes of the undertaking—the loans to be repaid in 10 and 25 years respectively. There is also power to borrow further money with the consent of the Minister of Health.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for March 18.]

Nos. 6320-7004.

ARENDT, E.—"Scavenging pumps for gas engines." No. 6678.
DEGENHARDT, W. R.—"Apparatus for delivering measured quantities of solid fuel." No. 6438.
DEGENHARDT, W. R.—"Apparatus for conveying solid fuel to retorts, &c." No. 6444.
DOCKREE, M. I.—"Incandescent gas burners." No. 6646.
DRAWE, R.—"Gas engines." No. 6677.
EHRHARDT & SEHMER AKT.-GES.—See Drawe, R. No. 6677.
EHRHARDT & SEHMER AKT.-GES.—See Arendt, E. No. 6678.
GLASSCOE, T. H.—"Gas geysers, &c." No. 6931.
INTERNATIONAL COMBUSTION ENGINEERING CORPORATION.—"Carbonization of coal, &c." No. 6899.
MOSS, W. L.—"Process for purifying coal, &c., gases." No. 6655.
MÜLLER, C.—"Gas heating stoves." No. 6869.
REESON, J. N.—See Moss, W. L. No. 6655.

Explosion at Notting Hill Gate.—Last Thursday night a series of explosions, which blew up six electric light distributing boxes, and damaged about 300 ft. of pavement, occurred.

"Pollard" Safety Geyser.—In the notice of the exhibits at the Ideal Home Exhibition which appeared in our issue for the 11th inst. (p. 605), the name of the proprietary Company of the "Pollard" Safety Geyser was incorrectly spelt. It should, of course, have been the Pollard Engineering Company, Ltd.

Explosion at Acton.—Four men were injured by an explosion of gas which occurred last week at the Prince of Wales public house, Acton Lane, Chiswick Park. The explosion wrecked the bars and blew-out the windows. An elderly man named Thomas Greig sustained a fractured thigh.

The Gas Mantle.—Mr. Warburton, of the Ramie Company, Bredbury (Branch of Lighting Trades, Ltd.), addressed the members of the Sheffield Illumination Society on March 12, his subject being "The Manufacture of a Gas Mantle." This was the third of a series of lectures under the auspices of the Sheffield Illumination Society, and was presided over by Mr. Colquhoun, Superintendent of the Sheffield Corporation Lighting Department.

Smokeless Fuel at Glasgow.—The installation in Glasgow of Maclaurin plant for making smokeless fuel is almost completed, and is expected to be in operation by Easter. Mr. William B. Smith (a member of Glasgow Town Council, and Chairman of the West of Scotland Branch of the Smoke Abatement League) states that the erection of the plant has taken longer than was anticipated, because of time spent on the selection and preparation of the site and foundations, and on account of provision being made at this stage for future developments.

Wrexham Gas Company.—Presiding at the annual meeting of the Company, Mr. J. Oswell Bury said the past year had been marked by steady progress. The question of issuing further stock and loan capital was under consideration. The revenue account was satisfactory. The total receipts from the sale of gas amounted to £34,999—an increase of £392. Residual products realized £11,708—an increase of £526. The aggregate receipts were £47,832, compared with £46,869 in the preceding year, while the total expenditure was £38,492. After payment of interest on mortgages and the half-year's dividend to June 30, there remained a balance of £15,164, out of which the Directors recommended payment of a dividend for the half-year at the rate of 7 p.ct. per annum on the redeemable preference stock, and at the rate of 5 p.ct. per annum for the same period on the ordinary stock. There remained a net balance to credit of profit and loss account of £11,976—an increase of £996.

MISCELLANEOUS NEWS.

NATIONAL BENZOLE ASSOCIATION.

The Sixth Annual Meeting of the Association was held on March 18—Mr. D. Milne Watson, the President, in the chair.

CHAIRMAN'S REPORT.

The CHAIRMAN, in reviewing the work of the Association during the past year, said: The most important matter I have to bring before you is the work of the Joint Benzole Research Committee. This Committee have worked exceedingly hard, as I am sure you will appreciate when you read the second annual report. The constitution of the Committee is as follows:

Chairman.

W. G. Adam, B.A. (Oxon).

Vice-Chairman.

A. Smithells, C.M.G., D.Sc., F.R.S., Emeritus Professor of Chemistry.

Representatives of the University of Leeds.

J. W. Cobb, C.B.E., B.Sc., F.I.C., Professor of Coal Gas and Fuel Industries (Honorary Secretary).
J. B. Cohen, D.Sc., Ph.D.. F.R.S., Emeritus Professor of Organic Chemistry.
A. G. Perkin, F.R.S., Professor of Colour Chemistry and Dyeing.
W. T. David, D.Sc., Professor of Engineering.

Representatives of the National Benzole Association.

T. Howard Butler, Ph.D., M.Sc., F.I.C.
N. N. Holden.
S. A. Sadler.

Honorary Member.

S. Henshaw, F.I.C.

THE NEW RESEARCH CHEMIST.

Since the first report was published, Prof. E. C. Williams, who rendered such excellent service as the first Research Chemist to the Committee, has resigned his position as a representative of the Association, on account of other claims on his time. Mr. W. H. Hoffert has continued to act as Research Chemist; and I should like to take this opportunity of expressing our thanks to him for the energy, initiative, and experimental skill which he has displayed throughout in a very heavy year's work. The demands which were made upon Mr. Hoffert in various directions rendered necessary the appointment of Mr. Claxton as his assistant in July—an appointment which Mr. Claxton's work has already justified.

SILICA GEL AND ACTIVE CARBON.

It will readily be understood that the subject of the use of solid adsorbents such as silica gel and active carbon for the removal of the constituents of benzole from gas is one of considerable complexity, and its high order of importance to the benzole industry was held to necessitate its thorough investigation by the Committee without delay.

The results detailed in the first report, already issued, only formed the first step. Numerous statements have been made in publications and outside them respecting the absolute and relative excellencies of various forms of active carbon and silica gel, which plainly required further investigation. It was therefore decided to set on foot a systematic comparative examination of the properties of these substances, particularly under precisely defined conditions resembling those of industrial practice, as far as these can be reproduced in the laboratory. The influence of varying concentrations of benzene and of other constituents, particularly moisture, the effect of temperature, velocity of gas current, and other factors have been studied for a number of representative samples of active carbon drawn from this and other countries, and of silica gel. Interesting results have been obtained and are reported in the special section devoted to that subject, while, as in all sections of the report, a summary of the results obtained has also been made and placed along with the introduction. Perhaps all that is necessary to say here is that both active carbon and silica gel have shown themselves capable of such performances in the laboratory as undoubtedly justify their complete investigation on the full working scale. In this connection it may be noted that Mr. Hoffert, the Research Chemist, has on your behalf visited plants in Germany and France, at Leverkusen and Grenoble respectively, where active carbon was in use for benzole extraction. He had the opportunity of inspecting the plants under working conditions, and issued valuable reports upon them to your Executive Committee. A similar report on the visit to an active carbon plant at Bernau, near Berlin, has been made to your Executive Committee by Mr. Potter. Samples of the motor spirt recovered at these plants and of the active carbon used were taken, and have been subjected to laboratory examination. The results obtained by these new processes, and other considerations respecting the output of benzole motor spirit by the older-established and more standard methods have all pointed to the desirability of establishing much more firmly and rationally what the essential requirements of a motor spirit are, and more definitely what specification it should be required to meet.

THE REQUIREMENTS OF MOTOR SPIRIT.

Plainly, in order to obtain as much motor spirit as possible from our coal supplies, it will be necessary to have regard to three primary factors in production—the quantity of benzene (toluene, &c.) in gas and tar resulting from carbonization or from gasification processes under differing conditions, the efficiency and economy of extracting the benzene by washing or adsorption, and the effecting of any necessary purification with the minimum of loss and expense. The study of the requirements of motor spirit with the special object of providing adequate tests for it has been receiving the special attention of the Committee and the research staff during the last twelve months, though started before that time. Interim reports of a very interesting character have been submitted to the Research Committee by

Mr. Hoffert on several subjects connected with this important matter, but it has been decided not to issue these in their entirety until more definite recommendations as to tests arising out of them can be put forward than is possible at present. The investigation has centred upon two subjects of primary importance. One of these is the devising of a test which can be relied upon to give a clear indication of the liability of a commercial benzole to form a sludge on standing, or a gummy deposit on valves or other parts when used in an internal combustion engine. Another point recognized is the necessity for arriving at some test which will indicate the activity or inertness of a benzole in the corrosion of copper. For this purpose attention is being paid both to the estimation of the free sulphur occurring in the benzole, with which the corrosion of copper is undoubtedly associated (though in no way proportional to it), and to a more direct test by which the actual corrosion of the copper by the benzole sample can be determined in a form allowing quantitative expression. The conditions of formation of the free sulphur in benzole during the carrying-out of the works processes of distillation and refining are both varied and obscure, but laboratory investigation bearing upon that matter is also in hand.

During the year the Committee have received a large number of samples of crude benzole, motor benzole, active carbon, silica gel, and other substances which have greatly facilitated their work, and thanks are due to numerous donors and also to the National Benzole Company, Ltd., for placing the services of their Chief Chemist at the disposal of the Committee, which is greatly appreciated.

I feel sure it is your wish that a vote of thanks be recorded to the Joint Benzole Research Committee for the very excellent work they have carried out during the past year.

HARROGATE GAS ORDER.

Board of Trade Inquiry.

The draft of the Special Order promoted by the Harrogate Gas Company, under section 10 of the Gas Regulation Act, to empower the Company to purchase the undertaking of the Pateley Bridge Gas Coal and Coke Company, Ltd., and to extend their area of supply, was the subject of an inquiry presided over by Mr. H. C. Honey (Director of Gas Administration, at the Board of Trade) at the offices of the Board on Tuesday, March 17. Objections were raised to some of the provisions of the Order by the Harrogate Corporation, but the Corporation were not represented at the inquiry.

Colonel Geoffry Cox (Messrs. Dyson, Bell, & Co., Parliamentary Agents) explained the provisions of the Order and the objections which had been raised. The West Riding County Council had asked for a protection clause, and the promoters had agreed to apply to this Order a protection clause which was included in the Harrogate Gas Act of 1909, to the satisfaction of the County Council. The opposition of the London and North-Eastern Railway Company had also been withdrawn, following agreement as to the insertion of a protection clause. As to the opposition of the Harrogate Corporation, he said he did not understand it. The Corporation had adopted what he could not help calling a sort of "tip and run" policy. They had put in a number of objections, but had given no evidence in support of them, and had not seen fit to attend the inquiry. Their objections were not withdrawn, however, and he was bound to deal with them. The main object of the Order was to enable the Company to extend their limits of supply to include the four parishes of Dacre, Hartwith-with-Winsley, Bewerley, and High and Low Bishopside—all in the Rural District of Pateley Bridge. The proposal originated from a suggestion by certain individuals that their supply of gas was bad and expensive, and an appeal to the Harrogate Gas Company to help them. The Parish Councils had also appealed to the Company, who found that the Pateley Bridge Rural District Council had not the slightest objection to the present application. The Pateley Bridge Gas Company were supplying in two of the parishes named, and the two Companies had entered into a provisional agreement (which was scheduled to the Order) by which the Harrogate Company were to purchase the undertaking of the Pateley Bridge Company for £2500.

Temporary Provisions.

A clause in the Order set out a number of temporary provisions applicable to the added limits of supply. The provisions of the existing Acts and Orders of the Company, and the provisions of the Gas Regulation Act applicable to them, with respect to the quality, pressure, testing of, and the price to be charged for gas, and the discounts to be allowed, were not to apply to gas supplied by the Company within the added limits. (This clause was to apply from the date of transfer to the fourth usual quarter day after the date of transfer of the Pateley Bridge undertaking.) It was proposed, during the twelve months, that the maximum price in the added area should be 6s. 8d. per 1000 c.ft., which was the present price of the Pateley Bridge Company. Powers were sought by the Order to raise an additional £14,000 capital, with £7000 borrowing powers, making £21,000, and the expenditure of the whole of that was rendered necessary by the extensions of the area of supply. When the estimates were made, it was anticipated that the money would last five years; but the demand for gas had been more than was anticipated, and it was doubtful whether it would do so. A clause in the Order enabled the Company to supply gas of different calorific values in different parts of the area of supply. The Harrogate Corporation had said that there were no precedents for this clause; but this was not the case. In the Spenborough case there was a definite authority to declare different calorific values, and there were a number of cases in which different values had been in operation. Power was sought in the Order for a maximum price in the added area of 8d. per therm above the price charged in the existing limits. The present price charged by the Pateley Bridge Company was 6s. 8d. per 1000 c.ft. for a 525 B.Th.U. gas—equivalent to 1s. 3.2d. per therm. A clause for a superannuation scheme was included in the Order.

Objections of the Harrogate Corporation.

Coming to the objections of the Harrogate Corporation, he said they did not oppose the purchase of the Pateley Bridge Company and the extension of the limits of supply, so long as the Board of Trade were satisfied that it was in the public interests, and that it would not be detrimental to the Borough of Harrogate. As to the price of gas in the added area, and the differential of 8d. per therm, the Corporation stated that the price charged by the Pateley Bridge Company was 6s. 8d. per 1000 c.ft., which, with a 460 gas, was equivalent to 1s. 6d. per therm. The price charged by the Harrogate Company in the existing limits was 8d. per therm, *less* 10 p.ct. discount; and if that price was charged in Harrogate until the end of the period during which the Company could charge 6s. 8d. per 1000 c.ft. in the added area, it was obvious that the maximum price that could be charged in the added area would then be something less than 1s. 4d. per therm—an immediate reduction of more than 2d. Assuming the price of 6s. 8d. per 1000 c.ft. were justified, it was difficult to see why an immediate reduction should be guaranteed within a year. The burden of such a guarantee must, it was submitted, fall upon the consumers of gas in Harrogate. In this connection, Col. Cox pointed out that the Pateley Bridge Company supplied a 525 B.Th.U. gas, and not 460 B.Th.U., and, at 6s. 8d. per 1000 c.ft., this was equivalent to 1s. 3·2d. per therm, instead of 1s. 6d., as stated by the Corporation. There was no guarantee, therefore, of an immediate reduction, and the suggested hardships would not fall on the Harrogate consumers. The Corporation pointed out that the Company were not obliged to charge consumers in the added area (which was rural) the temporary price of 6s. 8d. per 1000 c.ft., or to charge a differential price, after the temporary period, and suggested that the Company should be required to charge a fair differential price in the added area, in order to ensure that the supply of gas in that area was self-supporting, and that no burden fell on the Harrogate consumers. Col. Cox, in reply to this, said that he could prove definitely that Harrogate was to-day reaping considerable advantage from the supply of gas by the Company outside Harrogate, and it was contrary to the policy of the Board of Trade to insist upon a differential price being charged. In the present case the Engineer to the Company had said that a differential of 8d. per therm was sufficient to cover the additional cost of supply in the added area, and when the consumption in that area justified it, it was the intention to reduce the price. The hope was that they would be able to supply in the added area eventually at the same price as in Harrogate. With regard to the additional capital powers, the Corporation did not object to the amount so long as the Board of Trade were satisfied, but submitted for consideration that the time had come when it would be better to limit the borrowing powers of the Company to one-third of the issued capital, instead of one-half. The circumstances in which capital was raised had improved of late, and share capital could be raised by such companies as the Harrogate Company upon good terms; and it was submitted that it would be better to preserve the margin between one-third and one-half as a reserve of power for any emergency in the future. The Company submitted that the proportion of money to be borrowed, sought by the Order, was based upon the well-established practice of the Board of Trade and of Parliament. The Corporation then asked that the power to declare different calorific values in different parts of the limits of supply should not be granted. Col. Cox maintained that this was necessary, and that it was not a novel proposal. The next objection was to the power sought to establish a renewal fund, in addition to the reserve and special purposes funds already authorized. It was stated that the Company were a maximum price company, and a renewal fund should not be authorized in their hands. The Corporation raised no objection to enlarging the objects of the special purposes fund should the Company see fit to adopt this course, but no further contributions from revenue to the funds of the Company should be sanctioned. On this, Col. Cox urged that the special purposes fund was to be devoted to particular purposes, which were not covered by the renewal fund; and the clauses set out definitely the purposes to which each fund was to be devoted. Money in one fund could not be used for the purposes of another fund. With regard to the granting of pensions and gratuities, the Corporation suggested that the clause authorizing this was too wide in terms.

Mr. *F. H. Robinson* (Engineer and Manager of the Harrogate Gas Company) gave evidence. Asked to explain why the differential price of 8d. per therm in the new area over the price charged in Harrogate was a fair one, in the interests of the inhabitants of both areas, he said this was based on the extra cost of laying a high-pressure main for supply to the new area. The capital cost was estimated at £16,158, to cover present requirements and the needs of persons *en route* who had already applied for gas. This included the purchase price of £2500, as well as £1300 for overhauling mains, services, and meters at Pateley Bridge, *less* the value of scrapped plant. The remaining £4842 of the £21,000 was for future developments in the extended area for the next five years. Since he had made his original estimate, however, it appeared that development would be such that this amount would be exhausted in a considerably shorter period.

Mr. Honey said he was satisfied as to the amount of capital, but not as to the differential price of 8d. per therm.

Witness said the basic consumption was taken in the first place, and the basic cost. In such a district as this the number of consumers per mile of main was less than in Harrogate, and capital charges were very much higher. In reply to Mr. Honey's request for figures, he said that, assuming the undertaking was selling 5 million c.ft. in the new area, the price of gas necessary to yield an adequate return on the capital expenditure was 11·2d. per therm. For an extra 6 millions, the figure was 9·3d.; at 7 millions it was 8d. The present consumption in the area of supply of the Pateley Bridge Company was about 2,750,000 c.ft., with 256 consumers. There was no objection from Pateley Bridge with regard to the 8d. differential, and the consumers had agreed to pay it. Some had signed agreements.

Mr. Honey said 8d. was a high figure.

Mr. *Francis Barber* (Chairman of the Harrogate Company) said it was the policy to reduce the differential as consumption increased,

and that in one area supplied by the Company, where the differential at first was 10d. per 1000 c.ft., the price had now been reduced to the same figure as in Harrogate.

Mr. HONEY suggested, in the interests of the Company and the consumers in the outside area, that it was better to put into the Order a provision to the effect that, when the consumption reached a respectable figure in the outside area, the authorized differential must be reduced. He pointed out that the Company were expecting considerable development in the new area.

Mr. *Barber*, on behalf of his Board, said he would have no objection to a provision of this sort if Mr. Honey considered it essential in the interests of the consumers.

Mr. *Robinson* said that unless the Company had power to declare different calorific values, they would have to suffer penalties at Pateley Bridge, for supplying gas of insufficient calorific value, or else they would have to start with a higher calorific value than that declared in Harrogate, and give away therms there.

Mr. HONEY had some doubt whether the renewal fund clause should be allowed. He did not think it had been allowed in the case of a maximum dividend company, and the special purposes fund was not usually allowed in the case of such a company.

Col. COX asked what was the objection to a renewal fund clause in the case of a maximum price company.

Mr. HONEY said it was that they had a reserve fund.

Col. COX replied that it was only a dividend reserve fund.

Mr. HONEY disagreed, and said it was also applicable to meet any extraordinary claim or demand.

Mr. *Barber* said that the clause was not sought for the benefit of the Company, but of the consumers, by enabling the price of gas to be stabilized at as low a figure as possible.

Sandown (I. of W.) Gas Company.—A very satisfactory position was disclosed at the annual meeting, at which Mr. Arthur Douglas (Chairman) presided. The profit on the year's working amounted to £2124, making, with the amount brought forward, a balance of £1733, after deduction of interim dividend. Out of this the Directors recommended a dividend for the year at the rate of 12 p.ct. on the original shares and £8 8s. p.ct. on the additional shares, of which £5 and £3 10s. respectively was paid in August last. They announced a reduction in the price of gas to ordinary consumers of ½d. per therm after the reading of the meters for the March quarter. An increase in the gas sold was recorded. The Chairman, in moving the adoption of the report and balance-sheet, directed attention to a diagram which showed the sustained increases in the output of gas made during the years Mr. H. W. Falkner had been their Manager and Secretary. Owing to illness, he had had to resign, and Mr. R. S. Falkner had been appointed to fill the vacancy. Mr. T. Manyard had been appointed to fill the vacancy of Secretary. New capital to the extent of £2500 had been issued during the year, and this had been more than fully applied for.

NORTH-EAST COAST COAL TRADE.

From our Own Correspondent.

A dull week has closed without any material change in the situation, except that matters must be getting steadily worse as long as the present slump conditions continue. More and more men are being thrown entirely out of employment, and practically all collieries are losing time—many of them several days a week.

Prices appear to have little influence, since, even at quotations which mean several shillings a ton loss, the orders seem to go elsewhere.

There is no demand for any kind of coal, and, apart from regular contract quantities, business in very slack in gas makes. Wear Specials quote nominally 20s. 6d. f.o.b., but for early definite business they can be booked at considerably less than this. The same applies to best qualities, which quote nominally 19s. 6d. to 20s. Other qualities are readily obtainable at 17s. to 17s. 6d., according to make and position.

Durham unscreened coking is very hard to sell, and 17s. to 17s. 6d. is the price of quite good brands. Best unscreened bunkers are in poor demand at 18s. to 18s. 3d.

COAL TRADE IN THE MIDLANDS.

From our Local Correspondent.

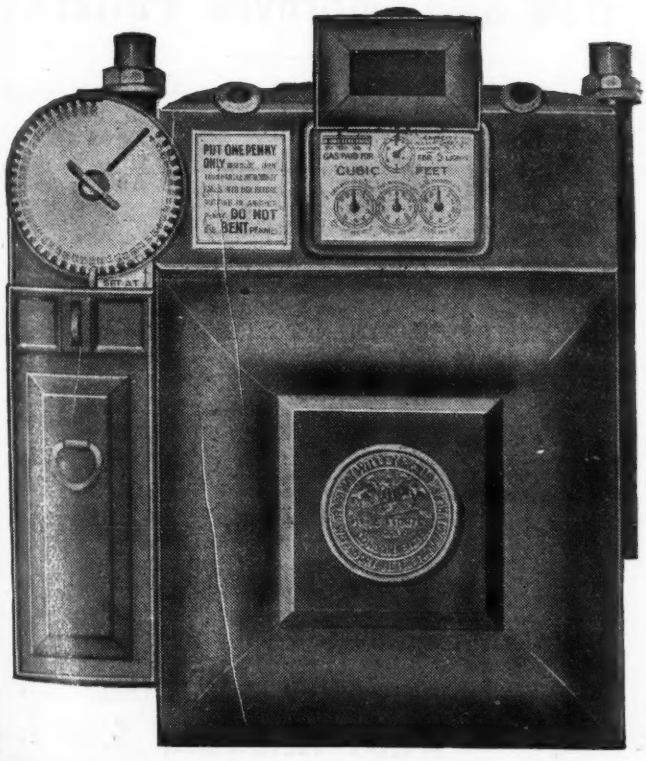
Market conditions have grown worse from the seller's point of view. Deterioration in the industrial demand is accentuated. At the Springvale Steel Works, in the Black Country, departments employing 700 hands have been suspended for lack of orders, and in other directions there is an evident slackening of activity. Values are suffering accordingly. Supplies of steam grades are offered at very low prices. The requirements of the electricity undertakings steady the market for D.S. nuts and beans; but in no direction is there any suggestion of stringency. While the easier tendency in regard to slacks continues, collieries are not as a rule overburdened with stocks, the meagreness of the trade in household fuel having kept output down.

The gorging of the gas coal market is undermining the price position. Negotiations for forward supplies develop very slowly. Consumers expect to obtain larger concessions than would now be entertained. Collieries, however, regard the spot lots which are being offered at several shillings below contract rates as an aberration which will pass. The adjustment of output to demand is receiving close attention in all the coalfields.

A fickle demand for household supplies is being met principally out of stocks in intermediate hands. With the season so far advanced, merchants are concentrating on the liquidation of holdings.

Blast-furnace cokes are being offered at about 15s. at ovens for medium grades. This figure only applies to spot lots, however, contract prices being about 2s. higher.

PERFECTION.



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20, West Campbell Street, Glasgow.

YORKSHIRE AND LANCASHIRE COAL TRADE.

From our Local Correspondent.

Gas coal in Yorkshire and Lancashire is moving steadily under contract, with indications of reduced prices for renewals.

The household section of the trade remains steady, with deliveries likely to be reduced owing to the approach of spring. Prices remain normal.

Industrially, there is no indication that "spot" figures for the cheaper grade of fuels are being taken advantage of; contractors finding it difficult to fulfil their obligations.

The slump in the export market continues, and prices as a result rule low.

Prices at Hull at the week-end were: South Yorkshire—Hards, Association, 19s. 6d. to 19s. 9d.; screened gas coal, 20s. to 20s. 6d.; washed trebles, 20s. 6d. to 21s.; washed doubles, 17s. 6d. to 18s.; washed singles, 17s. 3d. to 17s. 9d.; washed smalls, 13s. 6d.; unwashed doubles, 15s. 9d. to 16s. 3d.; rough slack, 11s. to 11s. 6d.; smithy peas, 20s. 6d. to 22s. West Yorks—Hartleys, 17s. to 19s.; screened gas coal, 20s.; washed trebles, 19s.; washed doubles, 16s. 6d.; washed singles, 16s. 6d.; washed smalls, 13s.; unwashed trebles, 18s.; unwashed doubles, 14s. 6d. to 15s.; rough slack, 11s. to 11s. 6d.; coking smalls, 10s. 6d. Derbys and Notts—Top hards, 19s. 3d. to 20s.; washed trebles, 18s.; washed doubles, 18s.; washed singles, 17s.; washed smalls, 13s.; unwashed doubles, 15s. to 16s.; rough slack, 11s. to 11s. 6d. Yorks, Derby, and Notts—Screened steam coal, 16s. 6d. to 18s.; gas coke, 21s. 6d. to 23s.; furnace coke, 17s. to 18s.

TRADE NOTES.

George Waller & Son, Ltd.

This firm have recently received orders for their patent "Retriever" pan ash separating and coke breeze washing plant from the Stoke-on-Trent Corporation and the New Southgate Gas Company.

Davis Geysers.

The Davis Gas Stove Company, Ltd., No. 60, Oxford Street, London, have published a new booklet, printed in colours, describing their geysers. A special point is made of ventilation, and a diagram shows alternative methods of terminating a geyser flue.

Spencer (Melksham) Limited.

This firm have collected in a brochure a number of very fine illustrations of plant they have installed at their works. They inform us that they have a set of lantern slides available for anyone who wishes to give a lecture on the mechanical handling of material. Application for these should be made to the firm at Melksham, Wilts, or No. 32, Queen Victoria Street, London, E.C. 4.

Material Handling Economies.

Messrs. Herbert Morris, Ltd., of Loughborough, have just published a handbook on material handling economies. It is devoted principally to light cranes, travelling on rails overhead and operated by electric motors. It is shown in detail that man-power in factories and warehouses can be made very much more productive when assisted by suitable handling machinery. Photographs are reproduced showing a great variety of industries in which operations have been speeded-up by the use of Morris overhead electric cranes.

CONTRACTS OPEN.

Repairing Retorts.

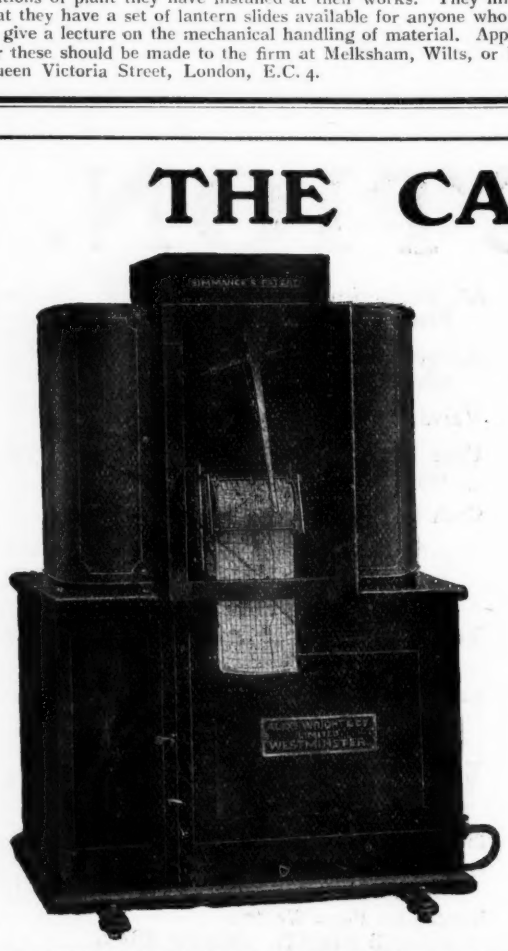
The Maryport Urban District Council are inviting tenders for the repair of retorts. [See advert. on p. 758.]

Birmingham Gas Guessing Competition.—The gas guessing competition promoted in Birmingham by the Retail and Wholesale Traders' Joint Committee in aid of the Lord Mayor's Unemployment Fund realized £1000, and this amount was handed to the Lord Mayor on Friday last. There was, it is stated, no deduction for expenses.

Staveley Coal and Iron Company, Ltd.—Intimation has been received from the Staveley Coal and Iron Company, Ltd., that on and after to-day their London office address will be removed from 34, Victoria Street, Westminster, to Crown House, Aldwych, W.C. 2, where the telegraphic address will be "Stavironco, Estrand, London," and the telephone number Regent 4846.

A German View of English Apparatus.—In "Das Gas- und Wasserfach" for March 7, Herr Ernst Körting, of Berlin, compares, in connection with the Gas Light and Coke Company's 1924 results, some English gas supply conditions in comparison with those existing in Germany. In general, he says, the Londoner uses very much more gas than the Berlin consumer. He puts the London average at 974 cub.m. [34,400 c.ft.] per consumer, against only 510 cub.m. [18,000 c.ft.] in Berlin. This is attributable, not only to the bad conditions in Germany, but also to the national character. The German housewife is more economical. In addition, it is claimed that German cookers and gas "stoves" are more efficient than the English. The German stoves give 50 p.ct. more heat to the room than the English fires, which use only the radiant heat. In other words, even if gas is more expensive in Germany, as it always has been, the technical construction of apparatus and the economy of the people have been so developed that the family budget contains much smaller charges for gas than in England.

THE CALORGRAPH



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STOCK MARKET REPORT.

LETHARGIC conditions prevailed on the Stock Exchange last week. The uncertain monetary position, pressure of the tax collector, and the possibilities of the Budget may all have played a part in bringing about this state of affairs. Caution was the rule in most markets, only sound investment securities receiving any support.

New issues temporarily held up by the rise in the Bank Rate are again appearing. Notice of a combined issue by four municipal corporations, of an aggregate total of £1,100,000 4¾ p.ct. stock at 97½, was published at the week-end. The Midland Bank offer 600,000 £1 shares at £2 each, and the Tanganyika Concessions Ltd. 1,500,000 £1 shares at 22s.

There were very few fluctuations in gilt-edged securities. Home Rails were still depressed. This market was not assisted by the comparative failure of the North Eastern £6,000,000 5 p.ct. preference offer to stockholders; £4,000,000 only being subscribed, and applicants receiving full allotments.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr.	Dividends. Last Hf. Yr.	NAME.	Quotations. Mar. 20.	Rise + or Fall − on Week.	Transaction Lowest and Highest Prices.
£			% p.a.	% p.a.				
171,978	Stk.	Feb. 5	5	5	Aldershot 5 p.c. max. C.	78—81	..	..
235,492	,,	,,	4	4	Do. 4 p.c. Pref.	71—76	..	..
1,351,868	,,	Sept. 25	6	6½	Alliance & Dublin Ord.	65—70	..	73—73½
374,000	,,	Jan. 8	4	4	Do. 4 p.c. Deb.	61—66	..	69—69½
300,000	5	Oct. 23	8	8	Bombay, Ltd.	..	..	..
100,000	10	Mar. 5	8½	8½	Bournemouth 5 p.c.	5—5½	..	5 1/16—5⅛
425,050	10	,,	7	7	Do. B 7 p.c.	12—13	..	..
150,000	10	,,	7	7	Do. Pref. 6 p.c.	12½—12¾	..	..
50,000	Stk.	Jan. 8	6	6	Do. 3 p.c. Deb.	10¾—11¾	..	12 1/16
162,025	,,	,,	3	3	Do. 4 p.c. Deb.	56—59	..	..
992,045	,,	Mar. 5	4	4	Brentford A Con.	76—79	..	..
990,500	,,	,,	6 1/16	6 1/16	Do. B New	105—110	..	..
76,000	,,	,,	6¼	6¼	Do. 5 p.c. Pref.	105—110	..	..
306,690	,,	Dec. 18	5	5	Do. 4 p.c. Deb.	95—98	..	..
281,337	,,	,,	4	4	Do. 6 p.c. Rich. Red. Deb.	76—81	..	..
214,740	,,	Mar. 5	6	6	Brighton & Hove Orig.	100—105	..	..
244,200	,,	,,	12½	12½	Do. A Ord.	165—170	..	..
1,287,500	,,	Feb. 19	8¼	9¼	Bristol 5 p.c. max.	122—125	..	168½
855,000	,,	Mar. 19	8	5	British Ord.	96½—97¼*a	..	124
100,000	,,	Dec. 18	7	7	Do. 7 p.c. Pref.	112—112*	−3	94½
120,000	,,	,,	7	7	Do. 4 p.c. Red. Deb.	123—128	..	113
100,000	10	Dec. 18	4	4	Cape Town, Ltd.	72—77	..	..
100,000	10	Nov. 6	8	6	Do. 4½ p.c. Pref.	7—8	..	..
150,000	Stk.	Dec. 18	4½	4½	Do. 4½ p.c. Deb.	6—7	..	..
626,860	,,	Feb. 19	4½	4½	Cardiff Con. Ord.	71—76	..	..
237,860	,,	Jan. 8	6	6	Do. 7½ p.c. Red. Deb.	101—104	..	..
157,150	,,	Feb. 19	7½	7½	Chester 5 p.c. Ord.	104—107	..	..
1,513,280	,,	Mar. 5	5	6¼	Commercial 4 p.c. Cap.	89½—94½b	−1	..
560,000	,,	,,	6	5/14/8	Do. 3½ p.c. Cap.	91—94	..	..
475,000	,,	Dec. 18	6	5⅝	Do. 3 p.c. Deb.	91—94	−1	..
800,000	,,	14 Jan. 15	3	3	Continental Union, Ltd.	57—60	..	92—94
200,000	,,	Dec. 18	—	—	Do. 7 p.c. Pref.	37—42	..	58
666,000	,,	Mar. 5	7	7	Croydon sliding scale	88—92	..	57
284,975	,,	,,	6½	6½	Do. max. div.	100—103	..	..
492,270	,,	Feb. 19	5	5	Derby Con.	83—86	..	..
55,000	,,	Jan. 8	6	9	Do. Deb.	110—112*c	..	84½
1,002,180	10	Jan. 22	4	4	European, Ltd.	74—76c	..	..
16,460,070	Stk.	Feb. 19	6	4	Gas Light & Coke 4 p.c. Ord.	7—8	..	..
2,600,000	,,	,,	5½	5½	Do. 3½ p.c. max.	89½—91½	−1½	6¾
4,062,235	,,	,,	3½	3½	Do. 4 p.c. Con. Pref.	62—65	..	89½—92
4,761,930	,,	Dec. 18	4	4	Do. 3 p.c. Con. Deb.	79—81	..	63¼—64
130,000	,,	—	3	3	Do. 10 p.c. Bonds	59—62	..	70—80
42,000	,,	—	10	10	Do. 7½ p.c. Ilford Deb.	..	..	60¾
82,500	,,	—	7½	7½	Hastings & St. L. 5 p.c. Conv.	..	..	..
258,740	,,	Mar. 19	6¾	6¾	Do. 3½ p.c. Conv.	92—92*	..	..
70,000	10	,,	5½	5½	Hongkong & China, Ltd.	73—78*	−3	..
86,600	Stk.	Sept. 25	10	10	Hornsey 7 p.c.	16—17	−2	..
1,976,000	,,	Mar. 5	10	10	Imperial Continental Cap.	138—143	..	7½
263,950	,,	Nov. 20	30	10	Do. 3½ p.c. Red. Deb.	175—180	..	..
235,242	,,	Feb. 5	3½	3½	Lea Bridge 5 p.c. Ord.	71—74	..	..
2,127,340	,,	Mar. 19	6¾	6¾	Liverpool 5 p.c. Ord.	96—101*	..	176—179
600,000	,,	Feb. 19	5½	5½	Do. 7 p.c. Red. Pref.	87½—88½b	−2	71½
165,736	,,	Mar. 19	7	7	Maidstone 5 p.c. Cap.	101½—103½*b	..	..
63,480	,,	Feb. 19	9	8	Do. 3 p.c. Deb.	122—132	−4½	..
75,000	5	Dec. 18	3	3	Malta & Mediterranean	54—59	..	..
541,920	Stk.	Dec. 4	7	5	Montevideo, Ltd.	4—4½	..	..
2,061,315	,,	Nov. 20	4	4	Newcastle & Gateshead Con.	62—67	..	..
300,929	,,	Mar. 5	5	5	Do. 4 p.c. Pref.	82—82½*d	..	64—65
529,705	,,	,,	4	4	Do. 3½ p.c. Deb.	72½—73½*d	..	..
15,000	10	Dec. 18	3½	3½	North Middlesex 10 p.c.	68—69d	..	..
75,940	10	Mar. 5	11	12	Do. 7 p.c.	15½—16½	..	..
300,000	Stk.	,,	7 1/16	8⅛	Oriental, Ltd.	11—11½	..	..
138,120	,,	Dec. 4	7	9	Plym'th & Ston'house 5 p.c.	102—107	..	..
60,000	50	Jan. 8	7⅛	7⅛	Portsea Island B	109—114	..	..
100,000	50	Mar. 5	13	14	Do. C	96—99	..	..
2,289,909	1	,,	12	13	Primitiva Ord.	93—98	..	..
311,100	100	Dec. 1	—	—	Do. 4 p.c. Red. Deb.	7/9—8/9	−/3	..
600,000	Stk.	Jan. 22	4	4	Do. 4 p.c. Red. Deb.	79—81	+1	2/0—8/6
320,335	,,	Dec. 18	4	4	Do. B. Aires 4 p.c. Rd. Db.	63—65	..	79⅞—80
321,670	,,	,,	4	4	Do. R'r P'te 4 p.c. Rd. Db.	65—67	..	63¼—63½
150,000	10	Mar. 19	6	6	San Paulo 6 p.c. Pref.	65—67	..	..
125,000	50	Jan. 2	5	6	Do. 5 p.c. Red. Deb.	7⅛—8*	−¼	..
270,000	Stk.	Aug. 28	5/8/4	5	Sheffield A	43—46	..	..
419,968	,,	,,	5/8/4	5⅛	Do. B	104—106e	..	..
1,047,000	,,	,,	5/8/4	5⅛	Do. C	104—106e	..	..
90,000	10	Oct. 23	8	6	South African	104—106e	..	..
6,609,893	Stk.	Feb 19	5	6¼	South Met. Ord.	7—9	..	..
1,895,445	,,	Jan. 8	3	3	Do. 3 p.c. Deb.	95—98	−1	..
734,000	,,	Mar. 5	6¼	6¼	Do. 5 p.c. max.	59—62	..	95½—97½
91,500	,,	Mar. 5	8¼	8¼	Do. 4 p.c. Deb.	83—86	..	97½
1,187,795	,,	Feb. 19	6¼	6¼	Swansea 7 p.c. Red. Pref.	72—77	..	84—84½
368,837	,,	Dec. 18	5	5	Do. 6½ p.c. Red. Deb.	101—103	..	..
647,740	,,	Nov. 6	5	5	Tottenham District A 5 p.c.	103—105	..	..
121,275	,,	Dec. 18	4	4	Do. B 3½ p.c.	116—119	..	..
250,000	,,	Mar. 5	7	7	Do. 4 p.c. Deb.	100—103	..	..
200,000	,,	Dec. 18	6¼	6¼	Tynemouth Con. and New	75—79	..	..
100,000	,,	Feb. 19	8	8	Uxbridge, Maidenhead, &	79—81d	..	..
882,275	,,	,,	6¼	6¼	Wycombe 5 p.c.	100—105	..	..
181,255	,,	Dec. 18	4	4	Do. 5 p.c. pref.	93—98	..	105
258,251	,,	Aug. 28	7/14/4	5	Wandsworth, Wimbledon, and Epsom—	90—95	..	..
187,294	,,	Feb. 19	6¼	6¼	Wandsworth A 5 p.c.	135—140	..	..
68,530	,,	,,	5	5	Do. B 3½ p.c.	114—119	..	..
91,600	,,	,,	—	6¼	Do. C and New	97—102	..	..
30,000	,,	Mar. 5	9½	9½	Wimbledon 5 p.c.	109—114	..	97
255,636	,,	,,	7½	7½	Epsom 5 p.c.	117—122	..	..
392,955	,,	,,	6/9/6	6/9/6	3 p.c. Deb.	57—60	..	..
352,000	,,	,,	7⅜	7⅜			..	..
90,000	,,	,,	7⅜	7⅜			..	..
88,416	,,	Dec. 18	3	3			..	..

Quotations at:—*a*.—Bristol. *b*.—Liverpool. *c*.—Nottingham. *d*.—Newcastle. *e*.—Sheffield. * Ex. div.

In the Industrial and Miscellaneous Markets the popular issues were as usual freely dealt in, but most of the business was confined to Teas, Textiles, and Tobaccos.

The factor that generally affects Gas Stocks and Shares was in evidence last week. Notice of their intention to raise the price of gas was given by the Directors of three London Companies. The South Metropolitan by ¾d. per therm, to 8¾d. per therm, the Commercial by ⅜d. per therm, and the South Suburban by no less than 1⅛d. per therm; and the stocks of all three Companies were marked down 1 point. The Gas Light ordinary stock also dropped 1½ points. This reduction may be in anticipation of an increase in the price of gas with its attendant fall in the statutory dividend, or it may be due to the general depression.

The Colonial Gas Association is issuing 63,647 8 p.ct. £1 preference shares at par, and of this number 20,000 are reserved for allotment in London. The Company, whose shares are not quoted on the London Exchange, own 17 gas undertakings in Australia. The interest on the preference shares was increased last year to 8 p.ct. per annum.

The following transactions were recorded during the week:

On Monday, Aldershot 4 p.ct. preference 73, 73½, Gas Light and Coke 91, 91¼, 91⅛, 91¾, 92, 4 p.ct. preference 79½, 80, Imperial Continental 176, 176½, 3½ p.ct. debenture 71½, Primitiva 8s., 8s. 6d., South Metropolitan 96½, 96⅝, 97, 97¼, South Suburban 5 p.ct. debenture 97½, Southampton 84½. Supplementary prices, Brighton and Hove 4 p.ct. debenture 76, Southend-on-Sea 5 p.ct. 90.

On Tuesday, Alliance and Dublin 69, 69⅜, Bahia-Blanca "A" 2s. 9d., Bombay 5 1/16, 5⅛, Commercial 4 p.ct. 94 *ex* div., Gas Light and Coke 90½, 90¾, 91, 91¼, 91⅛, 91⅜, Imperial Continental 178, Montevideo 64½, South Metropolitan 96, 97, South Suburban 5 p.ct. 106, Southampton 84, 84½. Supplementary prices, Bahia-Blanca "B" 3d., British, Hull 3½ p.ct. mt. debentures 61½, 62, Southend-on-Sea 5 p.ct. new 92.

On Wednesday, Bahia-Blanca "A" 3s., Bournemouth "B" 12 1/16 *ex* div., Gas Light and Coke 90¼, 90⅜, 90⅞, 3 p.ct. debenture 60⅜, Hastings and St. Leonards 3½ p.ct. converted 77½, Montevideo 64, Primitiva 8s., 8s. 6d., 4 p.ct. debenture (1911) 63 1/16, 63⅛, South Metropolitan 95⅞, 96, 96¼, 96½, 3 p.ct. debenture 60½, 6½ p.ct. debenture 103⅜ *ex* div., South Suburban 5 p.ct. 106½. Supplementary prices, Bahia-Blanca "B" 4d., Cheltenham 5 p.ct. max. cons. 77, Dover 5¼ p.ct. debenture 102½, Wandsworth 3½ p.ct. new 97.

On Thursday, Bombay 5⅛, Bristol 5 p.ct. max. 94⅜, British 113 *ex* div., Commercial 3 p.ct. debenture 58, Croydon max. div. 84½, Gas Light and Coke 89½, 90¼, 90½, 90⅜, 91, 3½ p.ct. maximum 63½, Hastings and St. Leonards 3½ p.ct. 77½ *ex* div., Imperial Continental 178, Montevideo 64½, 65, Primitiva 4 p.ct. debentures 79⅞, 80, South Metropolitan 95⅛, 95⅜.

On Friday, Brighton and Hove 168½, 7 p.ct. "A" 124, Commercial 4 p.ct. 92, 92½, 3 p.ct. debenture 58, Continental Union 37, European 6⅞, Gas Light and Coke 89½, 89¾, 90, 90⅛, 90¼, 90½, 3½ p.ct. maximum 63½, 64, 4 p.ct. preference 79, Imperial Continental 178, 178½, 179, Primitiva 7s. 9d., 8s., 4 p.ct. debentures 79⅞, 80, South Metropolitan 95½, 96¼, Uxbridge 5 p.ct. 105. Supplementary prices, Southend-on-Sea 5 p.ct. new 93, 5 p.ct. new "B" 89.

Funds were ample in Lombard Street at the close of the week. The discount market was weak, especially after the preliminary announcement of the Treasury Bill tendering, the average rate of which was over 3s. 10d. p.ct. less than that of the previous week, or £4 4s. 0·16d. p.ct.

In the Foreign Exchange Market the principal feature was the improvement in the French franc at the end of the week. The closing quotation was 92.05, being 37½c. better than Thursday's quotation, although 20c. below the figure a week ago. Belgian francs closed at 94.37½, and Italian lire at 117⅝. Sterling on New York opened a trifle easier, but closed unaltered at 4.78 1/16, or 1/16c. down on the week.

Silver was dull on American selling, and finished at 32d. per oz. Gold was 4d. higher on the week at 86s. 8d. per oz.

The Bank Rate is 5 p.ct., to which it was raised from 4 p.ct. on March 5. Bankers' deposit rates are 3 p.ct. The deposit rates of the discount houses are 3 p.ct. at call and 3½ p.ct. at notice.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

London, March 23.

The London Tar Products Market shows little movement, and there is not much buying taking place in pitch, the price for which is nominal at about 42s. 6d. net per ton. There are a few inquiries for pitch for next season, but sellers are loath to sell forward at the present level of price.

Creosote remains steady at about 7⅝d. to 7½d. per gallon, net and naked at works.

Solvent naphtha, pure toluole, and pure benzole are without change.

Tar Products in the Provinces.

March 23.

There is little alteration in the market for tar products.

Pitch remains about the same. Continental manufacturers have purchased fair quantities, and do not appear inclined to consider any further purchases except at a slight reduction on to-day's figures.

Creosote is still steady, and makers are anticipating a good demand for export for July-December.

There is no alteration in the tar acids market; while refined products are without change, and there is plenty of inquiry for both prompt and forward delivery.

The average values for gas-works products during last week were: Gas-works coal tar, 29s. 3d. to 34s. 3d. Pitch, East Coast, 40s. to 41s. f.o.b. West Coast—Manchester, 35s. to 36s.; Liverpool, 36s. to 37s.; Clyde, 39s. to 40s.; Benzole, 90 p.ct., North, 1s. 7½d. to 1s. 8½d.; crude, 65 p.ct., at 120° C., 10½d. to 11¼d., naked at makers' works; 50-90 p.ct., naked, North, 1s. 2d. to 1s. 3d. Toluole, naked, North, 1s. 7½d. to 1s. 8½d., nominal. Coal-tar crude naphtha, in bulk, North, 7½d. to 8d. Solvent naphtha, naked, North, 1s. 5d. to 1s. 6d. Heavy naphtha, North, 1s. 1d. to 1s. 2d. Creosote, in bulk, North, liquid, 6½d. to 6¼d.; salty, 6½d. to 6¼d.; Scotland, 6d. to 6¼d. Heavy oils, in bulk, North, 6¾d. to 7d. Carbolic acid, 1s. 6d. to 1s. 7d. prompt. Naphthalene, £12 to £15; salts, £4 to £5, bags included. Anthracene, "A" quality 3d. per minimum 40 p.ct., purely nominal; "B" unsaleable.

Gas Lecture at Burnley.—A lecture on "Gas Manufacture—Ancient and Modern," was given by Mr. Herbert Clegg, Gas Engineer to the Burnley Corporation, before the Burnley Literary and Scientific Club last week. In the course of his remarks he suggested that in the future electricity should be generated by gas, so that the valuable bye-products of coal could be conserved.

Infringing the Municipal Corporations Act.—A special meeting of the Smethwick Town Council has been called to consider the resignation of Mr. S. W. B. Stephen, the Chairman of the Gas Committee. It is stated that the explanation of his resignation is that his attention was drawn to the fact that he was infringing the Municipal Corporations Act by purchasing coke from the Corporation Gas Department. Mr. Stephen says he was completely unaware that the Act covered purchases from the Corporation by a member of the Council, though he knew sales to such body were forbidden. His purchases were made openly, and were paid for in the ordinary way of business; but, realizing that he had inadvertently committed a technical offence, he promptly tendered his resignation, solely on this ground.

National Trades Exhibition.

The National Trades Exhibition at Bingley Hall, Birmingham, which is under the direction of Mr. Charles Stanley, was opened on March 16 by the Lord Mayor of Birmingham, and will remain open for two months. Concerts are given daily by a regimental band—this week that of the Irish Guards occupies the platform. The exhibition is on the usual comprehensive lines. The great hall is filled with trade stands, and these cater admirably for domestic requirements. There are many exhibits of gas and electric equipment for the home. The Birmingham Gas Department are responsible for an excellent exhibit, which shows the adaptability of gas for all heating purposes, as well as its cleanliness, economy, and efficiency. A wide range of gas fires is shown; the latest heating equipment on the scullery side for working-class houses including Arden Hill's "all-cast" gas-heated wash boiler; a variety of cookers including the "New Cabinet," for cooking on one level; and the "New World" cooker fitted with the "Regulo" automatic oven-heat controller. The Parkinson Stove Company, of Birmingham, are also represented with cookers, fires, and water heaters.

Buxton's Gas Profits.—At a meeting of the Buxton Town Council the Mayor (Alderman Buckley) said that the profit for the year was £2148. During the year the price of gas had been reduced, which had meant a saving to the consumers of about £3000.

Aberystwyth Price Increase.—The Aberystwyth Gas Company have decided to increase the price of gas from the next reading of the meters by 2d. per therm. They announce that this step has been found necessary owing to the increased costs of manufacture and reduced value of residuals.

Swindon Debenture Issue.—On the opening of the tenders for the £56,240 of 5 p.ct. perpetual debenture stock which Messrs. A. & W. Richards offered on behalf of the Directors of the Swindon United Gas Company, it was found that the issue had been over-subscribed, at prices ranging from £100 down to the minimum of £95 p.ct.

Increase in Price at Swadlincote.—The Swadlincote Urban Council have decided to increase the price of gas as and from April 1 as follows: Inside the district, up to 450 therms per annum, 1s. 4½d. per therm; from 450 to 900 therms, 1s. 3¾d.; and over 900 therms, 1s. 2½d. Outside the district, for the same quantities, the prices will be 1s. 6d., 1s. 5¾d., and 1s. 5d. per therm respectively. Users of prepayment meters will not be affected.

Messrs. C. & W. Walker, Ltd.—The net profit of the Company for 1924 is £20,545, and a balance of £24,504 brought in gives an available total of £45,049. A final dividend of 5 p.ct. is proposed on the ordinary shares, making 10 p.ct. (tax free) for the year, together with a bonus of 1s. per share (also free of tax). The reserve fund is brought up to £45,000 by the addition of £5000, and a balance of £24,554 is to be carried forward. A similar dividend and bonus were paid for the previous year.

Messrs. Gibbons (Dudley), Ltd.—The Directors report a net profit for the past year, after providing for depreciation, of £18,333, which added to the amount brought forward, gives a sum of £32,545. They recommend that a dividend of 3 p.ct. (free of income-tax) be paid upon the ordinary capital, which, with the interim dividends already paid, will make a total of 10 p.ct. for the year; that £2500 be added to the reserve fund, raising it to £35,000; and that after payment of Directors' fees, &c., the balance be carried forward.

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